AD1000
Multifunctional Test Platform

User's Manual

Notices

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The material contained in this document is subject to change without notice. AD INSTRUMENTS makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. AD INSTRUMENTS shall not be liable for errors contained herein or for incidental or consequential damages in connection with furnishing, performance, or use of this material.

The battery is a consumable part and is not subject to the AD1000 warranty.

Safety Instructions

During each stage of operation of this instrument, please always observe the following safety instructions. Not taking any safety precautions or following the instructions will violate the safety standards of design, manufacturing and application of these instruments. In no case will AD INSTRUMENTS bear the responsibilities for consequences incurred by violation of the following instructions.

GENERAL

This product is a Safety Class 3 instrument. The protective features of this product may be impaired if it is used in a manner not specified in the operation instrument.

Environmental Conditions

It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables.

Before Applying Power

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note AD1000's external markings described under Symbols.

Do Not Operate in an Explosive Atmosphere

Do not operate AD1000 in the presence of flammable gases or fumes.

Do Not Remove AD1000 Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.
Instrument that appears damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Safety Terms Used in This Manual

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personnel injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

The **CAUTION** sign denotes a hazard. It calls attention to an

operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or the entire product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

NOTE

The **NOTE** sign information that may be beneficial during the use and maintenance of AD1000.

Laser Safety Announcements

WARNING!

AD1000 is a laser instrument. Users should avoid looking directly into the optic output. And the use of microscope or magnifier should also be avoided, for the use of such devices can focus a highly intense beam onto the retina, which may result in permanent eye damage.

Make sure that the optical fiber or cable is **not in use** and there is **no laser beam** in the fiber before testing with OTDR module or it may result in imprecise test trace, even permanent damage to AD1000.

CAUTION!

Laser Radiation: To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers.

- Always avoid looking directly into the optical output port, when AD1000 is working.
- Always replace protective dust cap on the detector port when AD1000 is not being used.
- Always avoid looking directly at unconnected end of optic fiber in testing and make the unconnected end pointing at a non-reflective object if available.

Electric Safety Announcements

If need to assure instrument thorough outage, please pull up power line and take the battery out

WARNING!

- AC/DC adaptor should be used only indoors.
- The ambient air of AD1000 place should be free flow.
- Any using of electric tools near inflammable gas or smog will be a big safety threat.
- In order to avoid electric shock, please don't use instrument if there is damage on any outside surface part(top cover, panel, etc)
- Only qualified professional staff can do electrified adjustment, maintenance and repair to the operating instrument.
- Even AD1000 power is cut off; the capacity in AD1000 might be electrified in some time after that.

CAUTION!

Battery: Battery of AD1000 is rechargeable lithium battery. If unused for a long time, battery should be recharged before use. If AD1000 is not in use for more than two months, it should be recharged to maintain adequate battery volume**.** Do not recharge batteries for more than 8 hours. Do not take batteries out without technical staff's help. Do not expose batteries to fire or intense heat. Do not open or mutilate batteries. Avoid touching the electrolyte in the batteries, which is corrosive and may cause injuries to eyes, skin or damage to clothes.

External Power: AD1000 supports external power. Power requirements: DC 24V/4A.

Agreement and Statement

Button or menu: The operating units in GUI that can be clicked by stylus, indicated by letters in square brackets, e.g. **[Setup]** and **[Start]**.

Key: The function key on front panel, indicated by letter or icon in quotation marks, e.g. " " (POWER) and " " (LIGHT).

Option label: Indicated by letters in brace, e.g. {Event} and {Trace Parameter}.

Label and subordinate specific options: Indicated by letters in angle brackets and square brackets, e.g. <Mode> [Average], which stands for averaging mode option; <Wavelength> [1310nm], which stands for 1310nm wavelength option.

Mode or module: Indicated by letters in quotation marks, e.g. "OTDR" and "OCI".

Conversation: Indicated by letter in quotation marks e.g."Confirm " and " Cancel " .

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1 General Information

1.1 Scope of this Manual

Thank you for purchasing AD Instrument. Please read this manual carefully before using any of AD INSTRUMENTS series fiber-optic instrument. Always observe the warnings and cautions appearing throughout this manual.

This manual contains the necessary information for proper operation and maintenance of AD INSTRUMENTS AD1000, troubleshooting instructions as well as information regarding obtaining services.

All AD INSTRUMENTS AD1000 are carefully assembled and undergo a rigorous mechanical, electrical and optical inspection prior to shipment. Beside AD1000, the package should also include a data transfer cable, a power adapter, a PC Analysis software installation disk and this users' manual etc. For detailed information, please refer to the packing list.

Upon receiving AD1000, please check for any obvious signs of physical damage that may have occurred during shipment. Report any damage to the shipping agent or the representative of AD INSTRUMENTS immediately. Retain the original packing materials in case reshipment becomes necessary.

1.2 Unpacking and Inspection

This instrument has been carefully packed in accordance with standard shipping procedures. Examine AD1000 for damage that may have occurred during shipment. If you find any damage or AD1000 is not working, or if any of the following items are not included, please contact your representative of Shineway Technologies, Inc.

If necessary, you may contact Shineway Technologies, Inc via this email: support@shinewaytech.com.

1.3 Introduction

AD1000 Multifunctional Test Platform is a compact modular platform supporting various functions as laser source, in-service optical power measurement/monitoring, bidirectional link loss testing, in-service PON OTDR testing, fiber termination inspection, visible fault locating etc. It is specially designed for FTTx/PON applications and can meet all test requirements of installers, contractors and service operators during optical network installation, service

activation, maintenance and troubleshooting.
AD1000 is easy to handle with large touch screen, accurate turning knob and smart user-interface. Windows CE system, large built-in and extended memory enable convenient test data storage, access and transfer to PC via USB for further analysis and reporting.

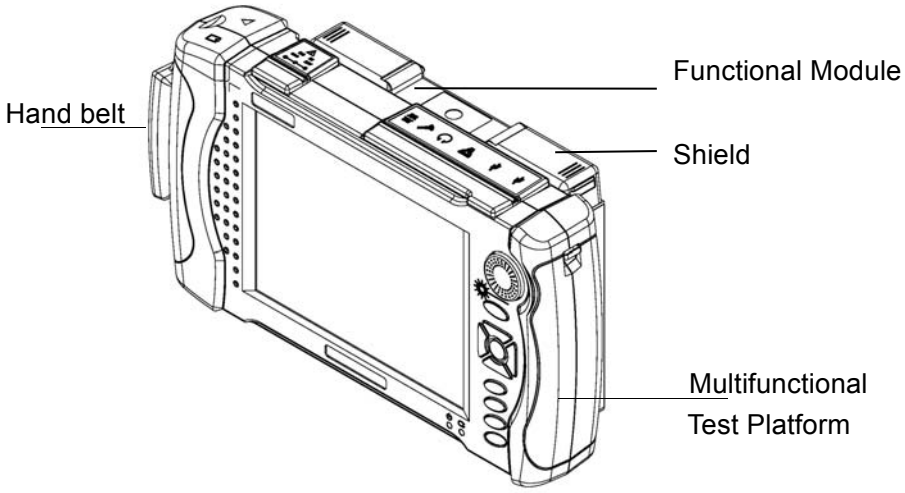
- 8.4" color LCD screen of sharp display, 4-level adjustable brightness;
- Convenient and flexible handling: Touch-screen, tuning knob, keypad and external USB mouse/keyboard;
- Data storage;
- USB data interface (Host and Client);
- PC software for test data analysis and reporting;
- Customizable screensaver feature for power saving;
- Optimized power management: 7 hours continuous operation.
- Direct printing through USB

Optional Functional Modules

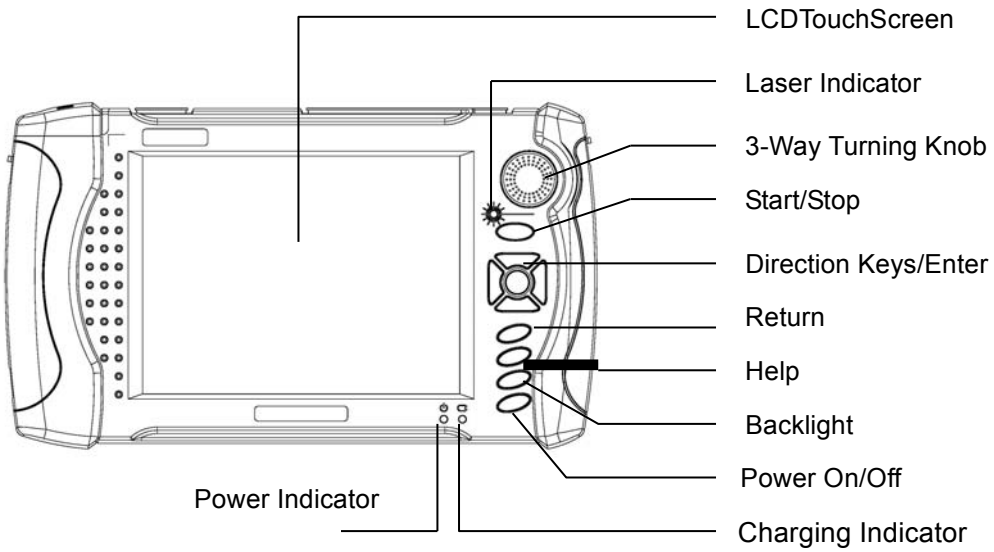
- OTDR Module (with VFL)
- OCI Module (Optical Fiber Connecter Inspection)
- Multifunctional Module (Laser Source, Optical Power Meter and Optical Loss Tester etc.)

1.4 Product Appearance

Overview



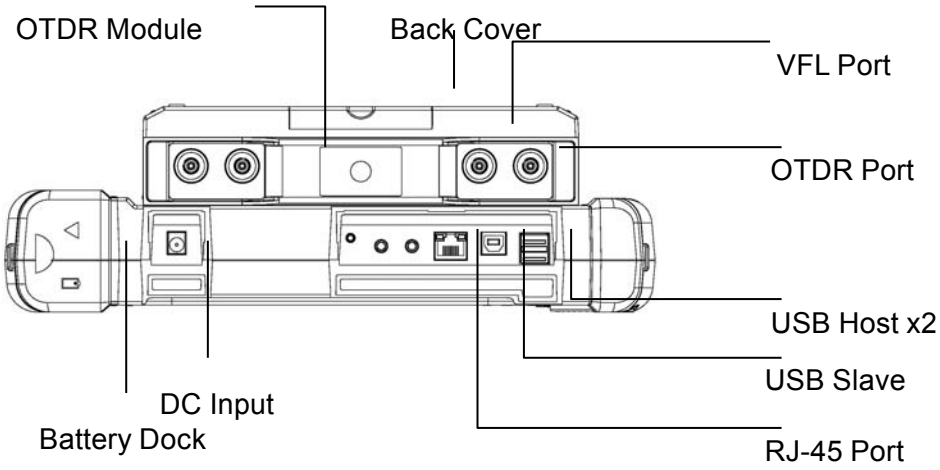
Front View



NOTE

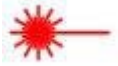
Power On/Off key is lower than other keys to avoid misoperation.

Top View



1.4 Front Panel Indicators Introduction

Icon	Status	Meaning
Power On/Off	Off	System off
	Green, constant	System on
	Red, blinking	Low battery, charging needed

Icon	Status	Meaning
Charging Indicator	Red, constant	Charging, with power adaptor
	Red, blinking	Low battery
	Green, constant	Charging complete, with power adaptor
	Off	Power adaptor unplugged or connection is poor
 Laser Indicator	Red, blinking	Laser on
	Off	Laser off

1.5 Front Panel Keys Instruction

Name	Function
▶/■ Start/Stop	Press to start, press again to stop.
	Launch selected module in main interface.
△	Move up or extended function to be defined, please refer to Help of current interface.
▽	Move down or extended function to be defined, please refer Help of current interface.
◁	Move left or extended function to be defined, please refer Help of current interface.
▷	Move right or extended function to be defined, please refer Help of current interface.
•	Enter (Temporarily no function assigned)
↰ BACK	Back
? HELP	Enter Help of current interface.
☼ LIGHT	LCD brightness adjustment. 4-level brightness, press to toggle between different levels.
⏻ POWER	Power on/off
	Press to power on system when system is off.
	When system is on, press and hold 1 second to enter screensaver mode for power saving; press and hold 3 seconds to power off system.
	In screensaver mode, press any key and hold 1 second to restore normal status (Or by clicking anywhere on touchscreen with

Name	Function
	stylus, clicking mouse left key, turning turning knob)

1.6 Operating Parts Instructions

Name	Operation	Description
Stylus	Click	Select certain module or menu.
	Double click	All major test functions can be operated by stylus clicking.
	Draw frame	1. Batch files selection in File Explorer. 2. Zoom in/out selected part of displayed trace.
	Click and hold	1. Open menu or select in File Explorer. 2. Select object in other windows.
Mouse (Optional)	Left click	Similar to stylus, more convenient for desktop application.
	Left double click	
	Left key draw frame	
	Right click	
Turning Knob	Up	OTDR quick operation.
	Rotate left	Move marker left precisely.
	Rotate right	Move marker right precisely.
	Down	Toggle between markers/assisting points

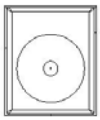
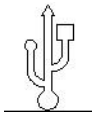
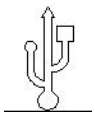
NOTE

- Stylus shouldn't touch the screen insufficient, otherwise might cause unable to operating regularly
- Stylus shouldn't touch the screen with too much force, otherwise might damage the LCD and touch screen.
- Please apply adequate force with stylus on the touchscreen,
- Only use AD1000 stylus, do not use other device. Sharp object like ball pen tip may smear or damage the touchscreen.

1.7 Instrument Interfaces Instructions

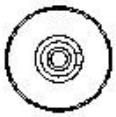
·Interfaces on Platform Top (Left to right)

Name	Appearance	Icon	Description

Name	Appearance	Icon	Description
DC Input			Power adaptor input
Serial Port			For system adjustment (Not open to user)
Audio Output			Audio output
Audio Input			Audio input
RJ45 Port			10/100Mbps Ethernet port
USB Slave			Connection to PC for data transfer
USB Host			Connection to USB devices, e.g. printer, mouse, keyboard and USB interface testing devices (Driver needed)

·Optical Ports

AD1000 is equipment with FC/PC connectors (Interchangeable SC, ST)

Name	Appearance	Icon	Description
Optical Port		OTDR	OTDR port
		VFL	Visible Fault Locator port
		OLT	PON Power Meter downstream input
		ONU	PON Power Meter upstream input
		SLS	Stabilized Light Source port
		OPM	Multi-wavelength Optical Power Meter port

NOTE

The amount of connectors depends on module configuration, not all modules are equipped with abovementioned optical ports

WARNING!

AD1000 is a laser instrument. Users should avoid looking directly into the optic output. And the use of microscope or magnifier should also be avoided, for the use of such devices can focus a highly intense beam onto the retina, which may result in permanent eye damage.

CAUTION!

Laser Radiation: To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers.

- Always avoid looking directly into the optical output port, when AD1000 is working.
- Always replace protective dust cap on the detector port when AD1000 is not being used.
- Always avoid looking directly at unconnected end of optic fiber in testing and make the unconnected end pointing at a non-reflective object if available.

1.8 GUI Icons Instruction

Icon	Status	Operation	Description
	Appear	--	Power adaptor plugged
	Green part change	--	Showing battery power level with percentage behind.
	Appear	--	Battery unplugged or connection is poor.
	---	Click	Start selected function
	---	Click	Enter Setup interface, including Interface style, Language and System setting etc.

Icon	Status	Operation	Description
	---	Click	Enter Help of current interface
	---	Click	Enter "About" interface
	---	Click	System off

1.9 Power Instruction

AD1000 uses following power supplies:

- AC adaptor (Connect to standard outlet – Indoor use only)
- Li-ion rechargeable battery (Auto power supply when AC adaptor is unplugged)
- Battery dock cover must be closed properly when AD1000 is working.
- AC adaptor and battery power supply can be switched without affecting operation
- After AC/DC power adaptor is connected, built in Li-ion battery will be automatically charged.

When only using Li-ion battery as power supply, following situations may cause AD1000 automatically power off or dysfunction

- The battery power indicator displayed on LCD screen will turn red (Low battery) when the battery power is insufficient and AD1000 may automatically power off.
- If unused for a long time, AD1000 may not power on properly, please connect power adaptor and recharge the battery.

1.10 Use of Rechargeable Battery

- Battery for AD1000 is Lithium rechargeable battery.
- 4 hours for full charge
- When AD1000 is charged by AC/DC power adaptor, indicator on the front panel will turn red and turn green after charge is complete.
- When AD1000 is powered on and being charged, LCD will also indicate charging status.

NOTE AD1000 battery is rechargeable Li-ion battery. If unused for a long time, please charge the battery to 50%-70% before conservation

CAUTION! Keep the battery off from fire and intense heat; do not open or short circuit the battery.

2 Basic Operation

2.1 Foreword

This part introduces the basic operation on the AD1000. Please read this manual carefully for optimal operation. Should you encounter any problems during operation, you are welcome to contact the technical staff of our company or representatives.

2.2 Power On/Off

Power on:

Press button till the LED power indicator is on.

Power off:

Press button and hold 3 seconds till the LED power indicator is off.

NOTE

Power off AD1000 will completely shut down the platform and modules. When power on, AD1000 will restart.

2.3 Enter and Exit Power Saving Mode

When power is on, user can set AD1000 to power saving mode and return to normal status. In power saving mode, the LCD backlight will turn off.

Two ways to enter power saving mode:

- Press button once to turn off LCD backlight, LED power indicator keeps on.
- When power is on, AD1000 will automatically enter power saving mode after its idle time exceeds pre-set value.

Exit power saving mode:

- Press button , LCD backlight will turn on;
- Or press any key on the front panel or turning knob;
- Or click the touch screen with stylus;
- Or click mouse.

2.4 Adjust LCD Brightness

The LCD lightness is 4-level adjustable.

Press button to toggle between different levels.

2.5 Start Application

When AD1000 is powered on, system will load the main program of MTP-Suite CE (Apllication software package) and enter main interface, as shown in Fig. 2.1

Launch OTDR program:

1. Select "Modules" label and then "OTDR Module" in main menu, the part will be highlighted
2. Then click

to start program

Launch Multifunctional module or optical connector inspector module application program

1. Select "Modules" label, then "multifunctional module "or "optical connector inspector module"
2. Then click **[**

] to start the program

NOTE

Application program is available only when relative functional modules is purchased.

2.6 Install USD Keyboard/Mouse

When need to input numbers and letters etc, there will be a soft keyboard displayed on the screen, user can use stylus do the input. Or, user can use keyboard with USB port or USB mouse to do the input.

Install USB keyboard or mouse on AD1000

Connect keyboard or mouse to the USB port, the port is on the top of AD1000.

NOTE

- No need to close AD1000 before connecting the keyboard and mouse. Software will recognize the keyboard or mouse.
- The soft keyboard will still be displayed on the screen even the keyboard is connected.
- System will recognize the mouse or keyboard and use them immediately.

2.7 Printer Configuration

Must configure a printer before print the trace or report.

Procedure:

1. Turn on printer power.
2. Use USB cable to connect AD1000 and printer
3. Enter OTDR interface
4. Click the [ ] on the lower right corner, enter Print interface, as Fig. 2.2 shown below

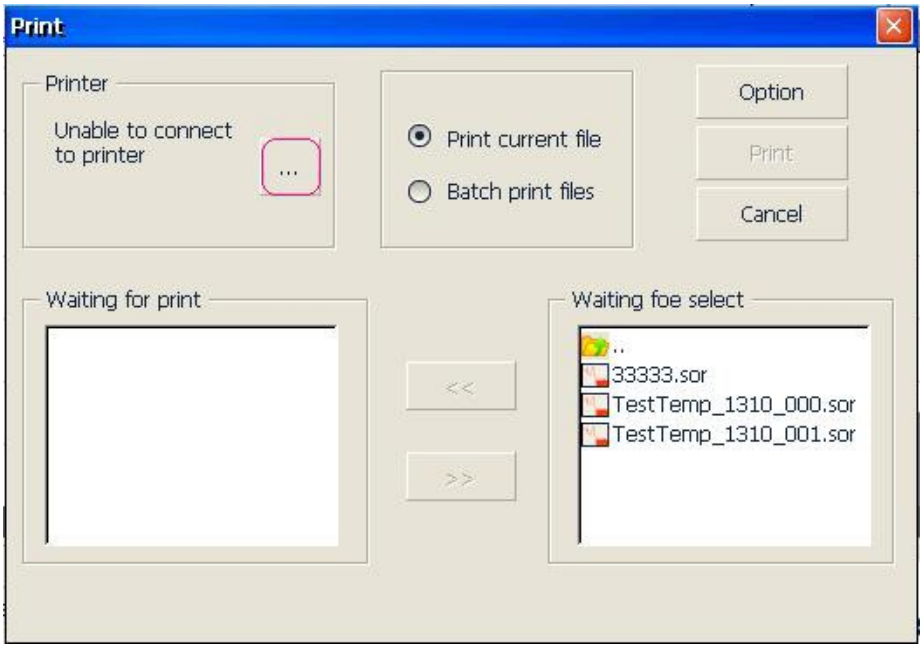


Fig. 2.2 Printer and setting interface

5. In Printer area, until now there is no default printer. Click [...], it will appear window as shown below:

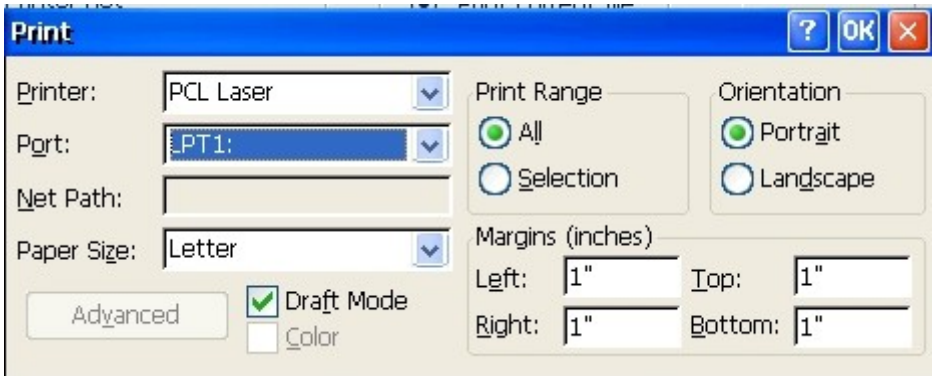


Fig. 2.3 Printer setting interface

6. In the printer list, choose the printer relative; chose "LPT1:"in the port list.

   Other options default is ok.

7. After right selection, click "OK" to finish the printer configuration.

NOTE

- AD1000 only support USB port printer with PCL language; till now the printers passed the test are LaserJet 1022，Hp Laser P2015d and etc.
- If the printer is not connected well, pull out the USB cable and reconnect the printer.
- No need to shut down AD1000 when connecting the printer.

3 Common Settings and Special Settings

3.1 Main Setting Menu

In setting menu, user can set up many settings, including interface style, language , power saving, system setting, touch screen calibration and etc.

Enter main setting menu:

When power is on, press the Setup button to enter the setting menu, as shown below:

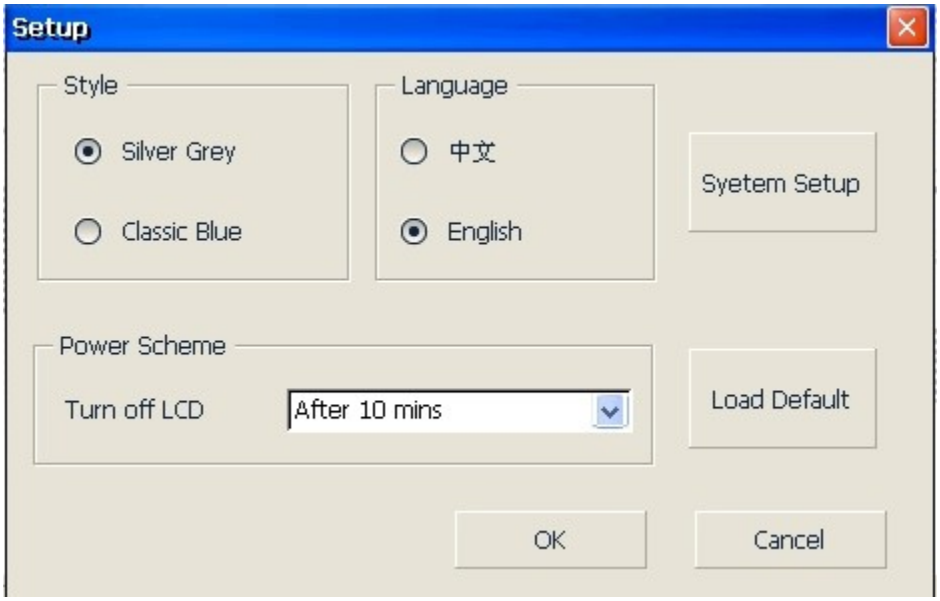


Fig 3.1 Main Setting Menu

3.2 Select language

Switching language:

1. Click **Setup** to enter into setting menu
2. In language area,choose the requiring language
3. Press "OK" to confirm modification
4. Power off and power on again

NOTE

- After changing language, please resetting, that the language you choose is available, user interface language and system language can be accordance.
- The equipment provides Chinese and English now.

3.3 Automatic Power Saving Setting

The feature is designed to save the battery power.

When power is on, AD1000 will automatically enter power saving mode after its idle time exceeds pre-set value.

Setting Power Saving Mode:

1. Click Setup to enter into setting menu
2. In power saving area of setup menu, choose preferred option in "Turn Off LCD"
3. Press "OK", Exit setup menu and opening power saving mode.

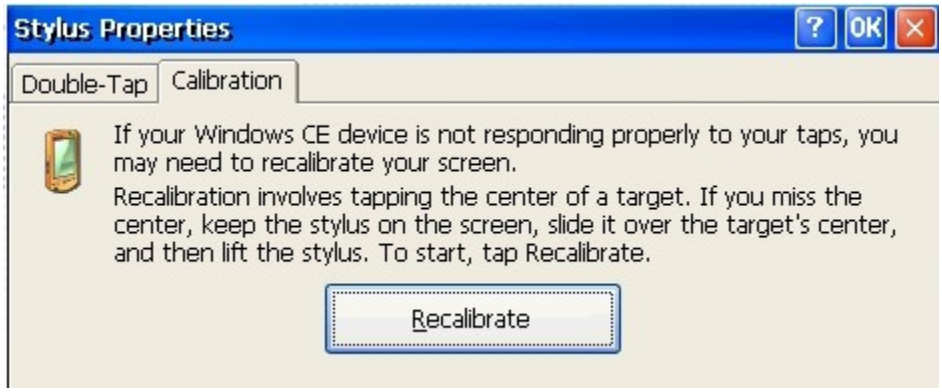
NOTE Power saving mode is on by default, and LCD backlight turn off automatically in 10 minutes.

3.4 Recalibrate Touch Screen

If touch screen is abnormal, you should recalibrate it.

Recalibrate touch screen:

1. Click Setup to enter into setting menu.
2. In setup menu, click [System Setup].
3. Double-click "Stylus" icon.
4. Click [Calibration] label and operate following the instructions.



5. When system shows "Press enter button to accept new setup", click the touch screen with stylus to complete new setting.

NOTE Touch screen can be calibrated many times, until you satisfy it.

3.5 Serious Deviation of Touch Screen

When deviation of touch screen is serious, it is difficult to calibrate only using stylus. You can use USB mouse to enter into calibration window, and continuing to calibrate with pen

3.6 Date and Time Settings

The current date and time show on the right top of interface. When save the testing results, the files contain date and time.

NOTE

- The equipment has special battery to keep the veracity of date and time.
- Don't open the equipment to change battery.
- Modifying time zone, date and time may affect some setting and operation of Windows CE, please modify these settings.

Set time and date:

1. On starting interface, click [Setup] to enter system setting, then choose [Date/Time]
2. Modify the setting
3. Click application to confirm modification.

Exit setting interface, return to control panel.

3.7 Other Parameters Configuration

In System setting (Control panel) to setup other parameters (Please refer to files about Microsoft Windows CE which is not included in this manual).

NOTE It's suggested to remain system settings unchanged unless it's necessary.

3.8 Load Default

This function is used to set system settings to factory default. Those parameters include: Interface style, language, power saving and OTDR features.

Load default:

In main interface, click [Setup]

In setting menu, click [Load Default], system promotes a warning message: "Restore factory settings?"

Click "Yes" to continue, click "No" to cancel.

NOTE Unless it's necessary, please do not load default because it will erase your existing settings.

4 Basic Information of OTDR Module

4.1 Principle of OTDR Module

OTDR (Optical Time Domain Reflectometer) is a measurement instrument for identifying optic fiber transmission features. AD1000 is mainly used to measure attenuation of a whole optic fiber chain and provide attenuation details relating to length, namely detect, locate and measure any event in optic fiber chain (Events refer to faults caused by splicing, connectors and bending). Its non-destructive, one-end connection and rapid measurement features have made the OTDR module an indispensable tool for the testing application of optic fiber manufacture, construction and maintenance.

The faults and heterogeneity of optic fiber itself cause Rayleigh scattering of light pulse transmitted in optic fiber. Part of light pulse is scattered in the reverse direction, and this is called Rayleigh backward scattering, which actually provides attenuation details relating to length.

Information relating to distance is obtained through time information (That's the reason why there is "Time Domain" in the name of OTDR). Fresnel reflection occurs at the boundary between two media of different IOR (For example, connections of faults, connectors, or optic fiber end). This reflection is used to locate the discontinuous points on optic fiber. The magnitude of reflection depends on the difference between IOR and the smoothness of boundary.

OTDR sends out a light pulse into the connected optic fiber, and receive reflections of events and backward scattering power of pulse in time. Locus will be displayed on LCD. The Y-axis is dB value of backward scattering power, and the X-axis is the distance.

4.2 Measurement Application of OTDR

OTDR displays power relating to distance of returning signals. This information can be used to identify the main properties of an optic fiber chain.

4.2.1 Measurement Contents of OTDR

- Event location (Distance),end or rupture of optic fiber chain
- Attenuation coefficient of fiber
- Loss of a single event (e.g. one optic tie-in), or total loss from upper end to end
- Range of a single event like reflection of connectors (Or grade of reflection)
- Auto measurement of cumulative loss of a single event

4.2.2 Trace Analysis of OTDR

The trace analysis of OTDR is fully automatic. The trace locates:

- Reflection events of connections and mechanic tie-ins
- Non-reflection events (usually at welding tie-ins)
- End of optic fiber
  Through scanning the first loss event that is larger than end threshold, end of optic fiber can be identified.
- Events list: event type, loss, reflection and distance.

4.3 Basic Definition and Classification of Events

4.3.1 Events

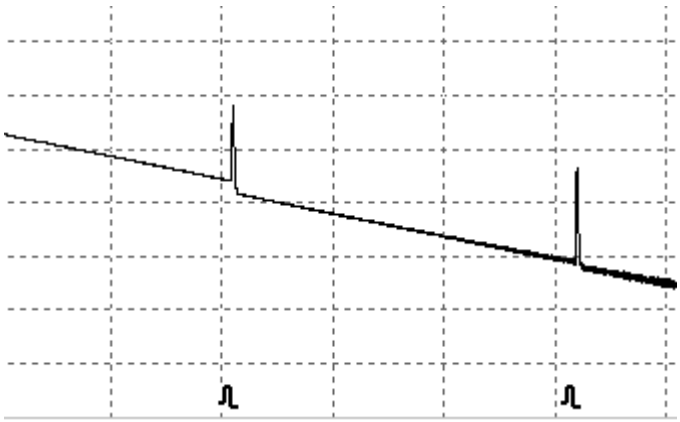
Events refer to any abnormal points causing attenuation or sudden change of scattering power besides the normal scattering of optic fiber, which include all kinds of losses like bending, connections and ruptures.

Events points displayed on LCD are abnormal points that cause traces to deviate from straight line.

Events can be classified as reflection events and non-reflection events.

4.3.1.1 Reflection Events

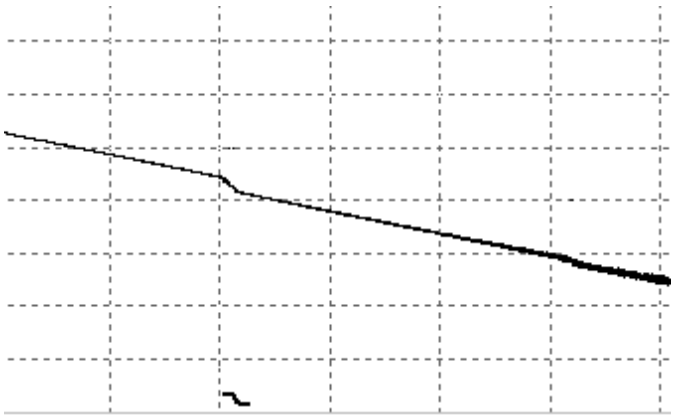
When some pulse energy is scattered, reflection events happen. When reflection event occurs, peak shows on trace, as shown below:



Reflection Event

4.3.1.2 Non-reflection Events

Non-reflection events happen at certain points where there is some optic loss but no light scattering. When non-reflection event occurs, a power decline shows on trace, see below:



Non-reflection Event

4.3.1.3 Inspection Events

OTDR sends off a light pulse into the optic fiber to be inspected, and then receive returning light signals, and starts calculating the "event" distance. The farther the distance is, the longer time need for scattered light to be received by AD1000. Event distance can be calculated according to the time of receiving events signals.

Through inspection of scattered signals, properties of optic fiber, connectors, and tie-ins can be identified.

4.4 Optic Fiber Link and Event Types

Event Type	Description
⊢	Beginning of optic fiber link
⎍	Reflection event
⎺	Non-reflection event
⊣	End of optic fiber link

NOTE End of optic fiber can be identified through scanning the first loss event that is greater than end threshold.

5 Instruction of OTDR Modules of AD1000

5.1 Main Features of OTDR Module

- High dynamic range and short deadzones
- Complete sampling under low noise, realize accurate low loss locating
- resolution is accurate to 10cm
- multiple test model, convenient to meet the requirement of any test condition

CAUTION! Make sure that the optical fiber or cable is **not in use** and there is **no laser beam** in the fiber before testing via OTDR. Otherwise, it may result in

imprecise test trace, even permanent damage for the OTDR

5.2 Measurement Mode of OTDR module

For convenience of customers use, OTDR offer many kinds of measurement mode. These modes can be used with combination

5.2.1 Auto Mode and Manual Mode

Auto mode: Calculate the length of fiber, setting Sampling parameters, getting and showing the trace, analyze the events.

Manual Mode: Advanced Mode which user can control all OTDR parameters to test.

5.2.2 Averaging Mode and Realtime Mode

Realtime Mode: OTDR will undertake realtime measurement for the connector od exterior fiber and refurbish the measure trace. Under realtime mode, unless the user stops measurement, it will measure all along.
Averaging Mode: Under Averaging mode, OTDR will average the data within the measure time which is set by user while exceeding the set time; it will stop automatically and display the result.

Generally, we suggest averaging mode.

5.2.3 In-service Mode and Normal Mode

In-service Mode: Measure live fiber, which use 1625nm to test.
This mode doesn't affect the normal working wavelength in the fiber under test.

Normal Mode: Use other wavelength except 1625nm (such as 1310nm, 1490nm, 1550nm and etc.) Make sure there is no laser transmitting in the fiber under test before testing.

CAUTION! When using the In-service mode, the fiber must be connected to the right port of 1625nm. If it is connected to other port; it may result in imprecise test trace, even permanent damage for the OTDR.

NOTE

- Only OTDR has 1625nm wavelength, In-service mode is available
- When OTDR is on In-service mode, other wavelength (such as 1310nm, 1490nm,1550nm etc.) is not available
- Above modes can be used with combination, but some mode is not available in certain conditions

5.3 OTDR Interface

When power on, it will show the main menu automatically

In main menu, select "OTDR module", click Start button to enter OTDR user interface, as follows:

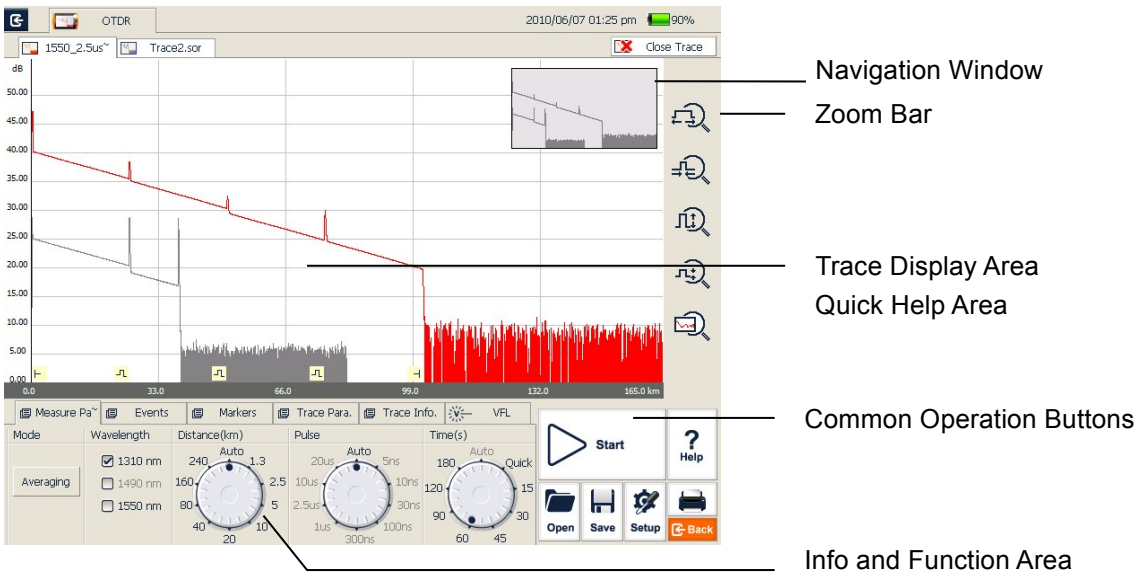
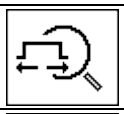
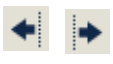


Fig 5.1 OTDR Main Interface

NOTE OTDR interface is available only when OTDR module is purchased and mounted.

5.4 Icons Instruction in OTDR Interface

No.	Icon	Description
1		Start testing
2		Stop testing
3		OTDR settings
4		Save trace file
5		Open trace file
6		Print trace file
7		Zoom in trace horizontally
8		Zoom out trace horizontally
9		Zoom in trace vertically
10		Zoom out trace vertically
11		Full-trace view
12		A/B marker switch
13		Move marker or marking point left/right
14		Toggle between marking points
15		Close trace

No.	Icon	Description
16		Return to previous menu
17		Return to previous menu

Table 5.1 Buttons and icons in OTDR main interface

NOTE Not all icons are displayed in one interface, they can be seen in different functional interfaces.

5.5 Trace Processing

The "OTDR TraceManager" software in MTP-Suite is for trace review and analysis on PC after acquisition without connecting to AD1000.

Trace processing includes:

- Trace editing (Single trace, multi traces)
- Printing (Single trace printing, batch printing)
- Trace format conversion

Bi-directional averaging program (For singlemode fibers only) is available in advanced versions to increase loss testing accuracy by averaging the measured loss values of each event from both directions.

6 Prepare to Use OTDR

6.1 Connectors Instruction

The optical ports equipped on AD1000 are FC/PC (Interchangeable SC, ST)

6.2 Cleaning and Connecting to Optical Fiber

To insure measurement accuracy, please clean and connect fiber properly before testing.

Connecting fiber to OTDR port is tool-free.

- Please refer to "Maintenance and Calibration" for optical port and connector cleaning.
- Clean connectors and check if fiber connector type is FC/PC
- Connect fiber to OTDR port.

NOTE Improperly connected fiber may cause serious loss and reflection.

WARNING! Please refer to Safety Instructions of this manual before testing to ensure personal safety.

CAUTION!

- When testing with OTDR, unless connected to specific optical port, please make sure there is no working laser in the fiber under test or it may cause incorrect result and even permanent damage to test instrument.
- Please not screw connectors too tight or it may damage fiber and optical port.

7 Test with OTDR

7.1 OTDR Quick Test

7.1.1 Check the connection between fiber and OTDR optical port, make sure it's well connected.

7.1.2 Click

icon or press ▶/■ button to start testing.

7.1.3 Click

icon or press ▶/■ button to stop testing.

Fig 7.1 shows the interface after trace acquisition:

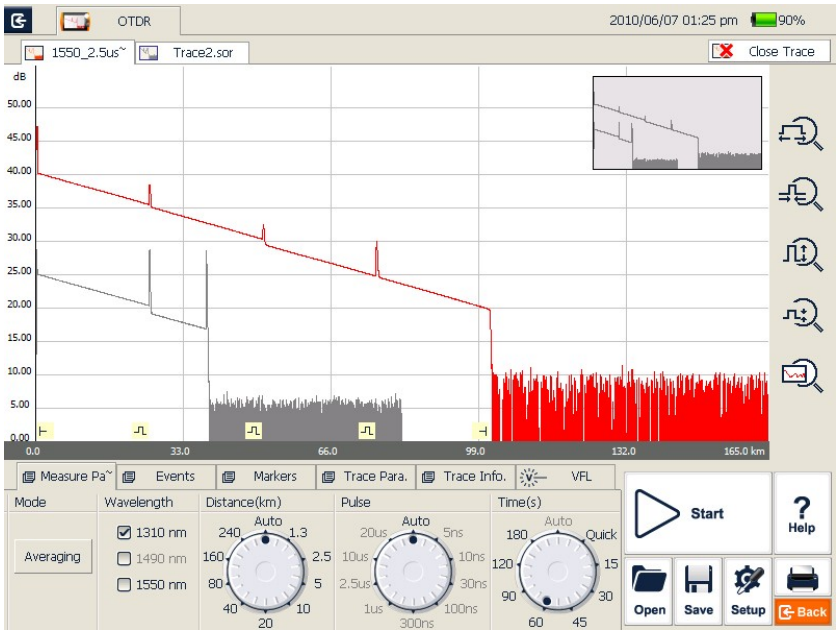


Fig 7.1 OTDR Trace Acquisition Interface

NOTE

- During testing, the averaging trace shows in the trace display area and refresh at certain intervals, the trace after testing finishes is the final trace.
- User can stop testing any time, application will show all the information when test stops.
- After test is finished or interrupted by user, system will perform automatic analysis which takes about 5 seconds or longer before user can start a new test.
- In Averaging mode, the interface will show the remaining time of the test.
- In Real-time mode, test will keep going until user stops it.

7.2 Trace Processing

After test and automatic analysis is complete, event types will be displayed below the trace area; user can review all events information in events list which is on {Events} label. User can also save traces, open saved traces to review and start new test after trace acquisition.

NOTE Application will promote user to save unsaved trace before starting

new test.

7.3 Unsaved Traces

Unsaved traces will be titled as "*U_xxxx" (xxxx stands for the current testing wavelength) which is displayed on the left upper corner of trace display area.

NOTE The traces whose file names start with star mark: "*" are unsaved traces or modified traces. Please refer to later contents of this manual for more information about OTDR trace modification.

7.4 Save Trace

When test is finished, user can save the trace with parameters information.

Procedure:

1. Click **[** Save **]** on the right lower corner of main interface and save dialog window will pop up.
2. File format: User can choose file format as ".sor" or ".jpg".
3. User can click button on the top of save file dialog to choose saving directory or click

to create new folder.
4. User can edit the name of the file to be saved; the file name consists of letters and numbers which can be input by soft keyboard.
5. File saving: In save dialog window, click [Save] button to save file.
6. Click [Cancel] to cancel file saving.

Save dialog window and options are shown below n Fig 7.2:

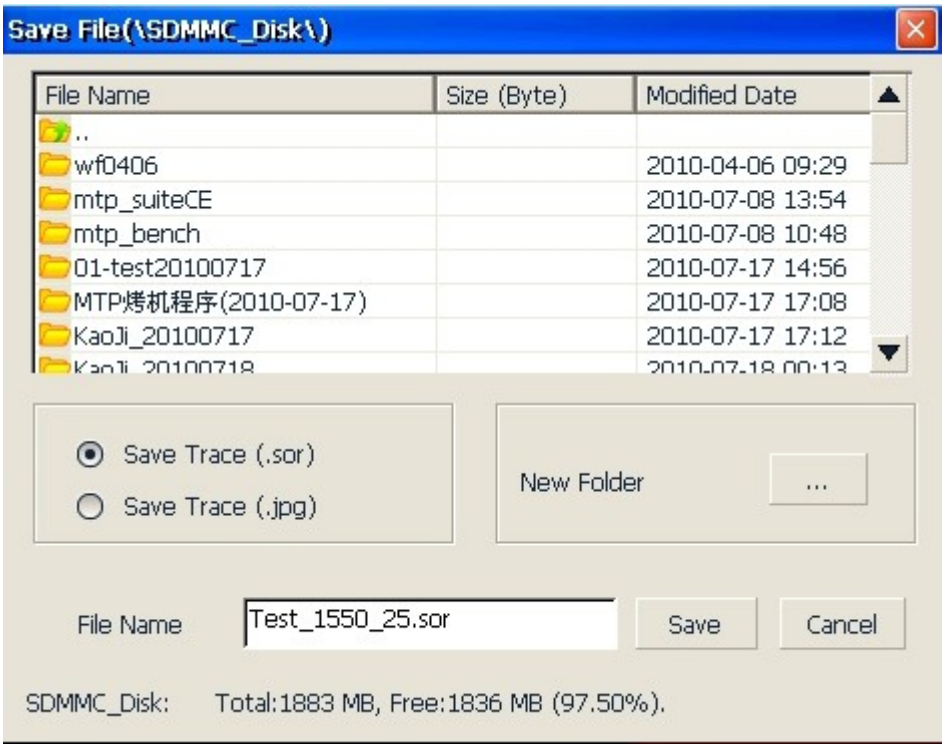


Fig 7.2 Save dialog window

Operation Notes:

- ✓ Title bar will show the current folder path, as shown in Fig 7.2: "\SDMMC_DISK\Traces\".
- ✓ System will automatically enter newly created folder.
- ✓ After file is saved, file name will be displayed on left upper corner of trace display area. Please note only the first 10 characters of the file name will be displayed and the rest are abbreviated as a "~" mark.

7.5 Auto Naming

System supports auto naming when saving traces,

Procedure:

1. Enable/disable auto naming by checking/unchecking "Auto Naming" in OTDR Setup.
2. User can edit auto naming rule by modifying file name prefix, input the prefix in "File Name" field. Please note the prefix is only effective when "Auto Naming" option is checked.

NOTE

- The file name in auto naming mode consists of: Prefix+Wavelength+Number, the number will increase automatically when user save traces.
- If the name of the file to be saved already exists, system will promote a warning message.

7.6 Open Saved Trace

Click [Open] button on the right lower corner in OTDR interface to open saved trace

1. In single trace display mode, when opening a new trace, the currently-displayed trace will be closed.
2. In Multi-trace display mode, user can open and display upto four traces at the same time.

NOTE

- Enable/disable Multi-trace display mode in OTDR Setup by checking/unchecking "Multi-trace" in Display Option.
- User can open and view ".jpg" format trace though "File Explorer" on {Program} label in AD1000 main interface. ".jpg" format trace can be also loaded to PC for viewing.

7.7 Trace Viewing and Analysis Operation

User can zoom in/out trace, utilizing markers and marking points for trace characterization including loss, attenuation, reflection and etc.

Zoom in/out trace:

- In trace display area, draw selection frame from left upper corner to right lower corner to zoom in trace.
- Draw selection frame from right lower corner to left upper corner to zoom out trace.

Show A/B marker:

- Click {Markers} label in OTDR main interface and markers or marker labels will show in trace display area.
- Or press turning knob once.

Move marker quickly:

- Select and hold the marker, drag it left or right to move quickly.
- Or click [ ] [ ] button on {Markers} label to move active marker left or right.

Move marking precisely:

- Turn turning knob clockwise to move marker right.
- Turn turning knob counterclockwise to move marker left.

Switch A/B markers:

- Click [ ] or [ ] button to switch A/B markers on {Markers} label.
- Or press turning knob once to switch.
- Or click the marker to select in trace display area with stylus or mouse.

NOTE

- When holding and moving marker with stylus, please apply adequate force or the operation may not be successful. Please try several times to get used to it.
- Marker operation and re-analysis are not applicable to '.jpg" format trace.

7.8 Information and Function Windows

Information and function windows are located at the bottom of OTDR interface.

Information includes: Event list, measurement parameters, markers information (A/B marker, marking points and etc.), trace parameters and trace information.

Information and function windows description:

Label	Function
Meas. Para.	Measurement parameters: Mode, Wavelength, Range, Pulsewidth, Averaging Time and etc.
Events	Add event, modify event, delete event and analyze event.
Markers	A/B switch, move, lock, loss and reflection analysis.
Trace Para.	Trace testing parameters
Trace Info.	Cable and fiber information viewing and editing.
Source	OTDR module built-in visible light source.

Table 8.1 Information and Function Windows Description

7.8.1 Switch Information and Function Windows

Click the labels of information and function windows to switch.

7.8.2 Events info reference

Click {events} info window changes into events info
Click [▲] and [▼] in scroll bars to look over events info

7.8.3 Reanalyze

When not satisfied with threshold, change threshold, then reanalyze the trace by this function to get satisfactory trace

Reanalyze the trace:

1. If possible, look over or reset threshold.
2. In {events}, click [analyze], system will reanalyze the trace.
3. When the analysis finished, events list will show the new results.

NOTE

- Reanalyzing may cause events deleted, events revised is resumed, and events deleted comes back etc.
- For more operation on events, please refer to "detailed information for analyzing and operating"

7.9 Upload Trace to PC

On computer, user can manage the trace file flexibly.

Copy or move the trace to computer:

1. User can copy the saved trace to computer via USB by PC software
2. Or user can copy and move the saved trace to computer by mobile hard disk drive/ USB flash disk

For more operation, please refer to "manage files and data"

7.10 Get help on OTDR

Click [Help] or "?" (HELP) to get detailed help, click " " (BACK) to exit

8 Testing Optical Fiber in Auto Mode

8.1 Instruction of Auto Testing Mode

When don't know the optical fiber length, can simply use the auto testing function to get the trace and analyze.

After the auto mode started, OTDR will automatically estimate the optical fiber length, set sampling parameter, get trace and display the event list and etc.

Under Auto Mode, user can set follow parameters directly.

- The wavelength be used for testing(at least one wavelength)
- Testing time span

NOTE

After Auto mode started, according to the situation of optical fiber link which connecting the equipment, application program will estimate the optimum setting automatically and it will need around 5s. If the testing was cut off, any date won't be displayed.

CAUTION!

Except the specific light port (light port used for online testing), do not connect the optical fiber which load signal to the OTDR port, any external signal over -30dBm will affect the OTDR sampling and cause permanent damage to the OTDR.

8.2 The procedures of auto testing mode

Test and get trace in Automode:

1. Connect the optical fiber to the right OTDR light port.
2. Set parameter: set the "Range" to " AUTO".
3. Set testing time span.
4. Start testing: Use stylus click [

] or press down the "▶/■" (Start/Stop) on front panel.
5. After test, can save the trace, check the trace, re-analyze the trace and etc. As to the detailed operation way, please refer to relative paragraph previous.

NOTE

- When testing automatically, Range is "AUTO"
- When setting the parameter, if the optical fiber parameter is not clear, can directly use the default value, but it may cause a bigger testing error.

9 Test the optical fiber in Manual mode

Manual mode can set various test parameter more precisely.

The premise is know the general situation of optical fiber and then set parameters precisely and gets more ideal test result.

Correct parameters setting is the essential condition of optical fiber accurate measurement. So, when test manually, must set parameters accord to requirements.

9.1 Common using parameters for OTDR testing.

Following testing parameters displaying on {Meas. Para.} option card on the OTDR surface, users can set conveniently

Parameter	Definition
Range	Distance range of the testing
Pulsewidth	The width of laser pulse launched to optical fiber by OTDR
Averaging Time	Testing time, choose the proper testing time
Wavelength	Laser wavelength, testing laser wavelength selecting
Mode	Testing mode, testing mode selecting

Table 9.1 OTDR common use parameters sheet

9.2 OTDR test parameters Configuration

Testing parameters in this section should be set in "OTDR Setting", click [Setup] on the OTDR surface to enter.

These testing parameters include: Optical fiber general setting, analysis parameters setting and etc.

Parameter	Definition
IOR	IOR of optic fiber which affects the transmission speed of laser. Need to set separately accord to working wavelength relatively
Scatter Coefficient	Also be called back scatter, which affects backward scatter power of laser in fiber
Non Reflection Threshold	Also be called splice loss detecting threshold. Non reflection event with insertion loss greater than this threshold will be displayed on trace
Reflection Threshold	Also called reflectivity. Reflection events with insertion loss greater than this threshold will be displayed on trace
End Threshold	Also be called optical fiber end detecting threshold. The first event with insertion loss greater than this threshold is identified as the end of fiber, and all following events will be ignored on trace.
Default	Revert to the values when leave factory

Table 9.2 OTDR test parameters setting sheet

9.3 OTDR display and other Configuration

Including setting of save method, testing display area and etc. Parameters setting in this part won't affect the testing result.

Setting	Content
Auto name	If be selected, the trace files saving will adopt auto name, the content in file name editing frame will be used as prefix of auto name; if not be selected, the auto name won't be used, need to enter file name.
Display grid line	If be selected, the grid line will be displayed when trace be displayed, otherwise not be displayed.
Support multi traces	If be selected, then support multi trace testing and display, otherwise only test single trace and display.
navigator window	If be selected, there will be a trace navigator window on the upper right on the trace window, it's easier to check the contracted drawing of whole trace. Meanwhile, can check or move magnify the windows position. If not be selected, can't see the navigator window and system default select "navigator window"
Display the zoom toolbar	If be selected, there will be a zoom toolbar on the right side of the trace window; if not be selected, there will be no zoom toolbar but a bigger trace display zone
length unit	Set the length unit displayed.

Table 9.3 OTDR display or other parameters setting

9.4 Real time and average test mode

Under sampling and accumulating condition, test mode has real time and average mode.

1. Under real time mode, instrument test the external optical fiber connection in real time and refresh display testing trace in real time. When instrument working under real time mode, user click [

] or press "▶/■"(Start/Stop) on front panel, the test will be stopped or the test will proceeding all the time.
2. Under average mode, instrument accumulate and average the testing data accord to the time user choose, test time is equal or greater than test time user set, display the result after the testing finished.

Under general condition, user chooses average mode will be ok.

Operating instructions

- ✓ Real time and average are controlled by **[Real time/Average] in {test setting}<test mode>**
- ✓ When the button highlight display "Average", it means real time mode; when button sag and display " Real time", it means real time mode
- ✓ When click the button, it will change between average and real time

9.5 Range Configuration

Under general condition, the Range setting is to select relative scope accord to the optical fiber real length; it will guarantee the test accuracy.

Range options: Auto,1.3km, 2.5km, 5km, 10km, 20km, 40km, 80km，160km, 240km etc.

Operation:

Click on the right range settings.

NOTE

- ◆ "Auto" is Auto test mode of OTDR, select this function, AD1000 will select a proper test range intelligently and the proper pulse width to test. The whole process no need user participate
- ◆ Default value is "Auto"

9.6 Pulsewidth Configuration

Pulse width selection affects the trace dynamic and resolution, select the smaller width to test can get a higher distance resolution and smaller dead zone, but the dynamic certainly damaged; oppositely, wider pulse width can get higher dynamic, test longer optical fiber, but it will affect the resolution and dead zone, the user must select between dynamic and dead zone.

Operation:

Click the pulse width number in pulse width parameter zone.

NOTE

- ◆ Default value: Auto

- When the distance range is "Auto", the pulse width will be "Auto", no need the user to set. There will be different pulse width options accord to different distance range.

9.7 Averaging Time Configuration

Test times affects the test trace SNR, the longer test time, the higher SNR and get a bigger dynamic, so, when test long distance optical fiber and check far end event, need to select longer test time.

Operation:

Click the time span number in time span zone.

NOTE

- Averaging time: Auto, Quick, 15s, 30s, 45s, 60s, 90s, 120s, 180s and etc.
- The default value is 60s

9.8 Laser wavelength Configuration

Select certain single wavelength or multi select up to the entire wavelength.

Operation:

Click wavelength in wavelength parameter zone to realize test wavelength for single selection or multi selection

NOTE The effective wavelength will be different accord to modules purchased.

9.9 IOR setting

IOR is a key factor to affect the speed of laser transmission in optic fiber; and in this case, IOR configuration has direct impact on the accuracy of measurement. Generally speaking, the IOR parameter is provided by optic fiber manufacturer, and it can be set to the accuracy of four digits after decimal point between 1.0000 and 1.9999.

9.10 Scatter Coefficient (Back scatter)

Scatter coefficient determines the value of backward scatter power. The configuration affects the calculation of reflection value

NOTE Configuration zone is -10 to -70dB

9.11 Non-reflection Threshold (splice loss detecting threshold) Configuration

This configuration has direct impact on the listing of insertion loss events. Only events greater than this threshold will be listed. The value configuration zone is 0.00 to 5.00dB

NOTE The default value is 0.20dB.

9.12 Reflection Threshold (Reflection detecting threshold) Configuration

This configuration has direct impact on reflection events listing. Only reflection events greater than this threshold will be displayed in events list. The value configuration zone is -10dB to -65dB

NOTE The default value is -52.00dB

9.13 End Threshold (optical fiber end detecting threshold) Configuration

This threshold is the end threshold of optic fiber. If the end threshold equals 3.0dB, then the first event with insertion loss greater than 3dB will be considered as the end of the optic fiber. The value configuration zone is 0.0dB to 20.0dB

NOTE The default value is 3.00dB.

9.14 Load Default

In OTDR Setup surface, there are 3 "default" button, corresponding to scatter coefficient (back scatter), non-reflection threshold (splice loss detecting threshold), reflection threshold (reflection detecting threshold) and end threshold (optical fiber end detecting threshold).

10 Use OTDR test FTTx-PON network optical fiber link

For FTTx-PON network optical fiber link, it's different from normal optical fiber link, there is branching unit in link. So, it need to know and note follow items when use this instrument test FTTx-PON network.

10.1 Use PON optimized OTDR instrument

Some models optimized specific to FTTx-PON network optical fiber link and can get fairly ideal result.

In order to get ideal result, it need to correctly set distance range, end threshold (optical fiber end detecting threshold), reflection threshold (reflection detecting threshold) and etc.

10.2 Select the proper distance range

As there is branching unit in FTTx-PON network optical fiber link, there will be a big attenuation event of tens dB, auto test may get a wrong distance. Suggest manually select the parameters like proper distance range, pulse width and etc accord to the prescient optical fiber link length.

10.3 End Threshold (optical fiber end detecting threshold)

As there is branching unit in FTTx-PON network optical fiber link, there will be a big attenuation event of tens dB, if the end threshold configuration is not proper, end event may be analyzed inaccurate.

For normal optical fiber link, end threshold configuration can be 3.0dB, as to PON network optical fiber link with branching unit, it need to set the end threshold to a proper value and then AD1000 can locate the end event correctly. Please refer to follow end threshold configuration sheet.

10.4 Test parameter recommendation value

Splitter type	Loss reference	End threshold configuration	Recommend test pulsewidth

	value	reference value	
1:8	≥9dB	12dB	100ns，300ns
1:16	≥12dB	15dB	100ns，300ns
1:32	≥15dB	18dB	300ns，1us
1:64	≥18dB	21dB	300ns，1us

Table 10.1 Recommended parameter values for PON network optical fiber link

11 Trace Analysis and Event Operation

11.1 Open trace file

Open trace file:

1. Press down [Open] in button column in OTDR surface.
2. Select the file need to be opened in the files dialog box.

If necessary, change the file position to search saved files.

If necessary, click the scrollbar on the right side, check the listed files.

3. Click [open] and the file opened.

If click [cancel], the file can't be opened and quit dialog box.

4. The file name displayed on the surface top left.

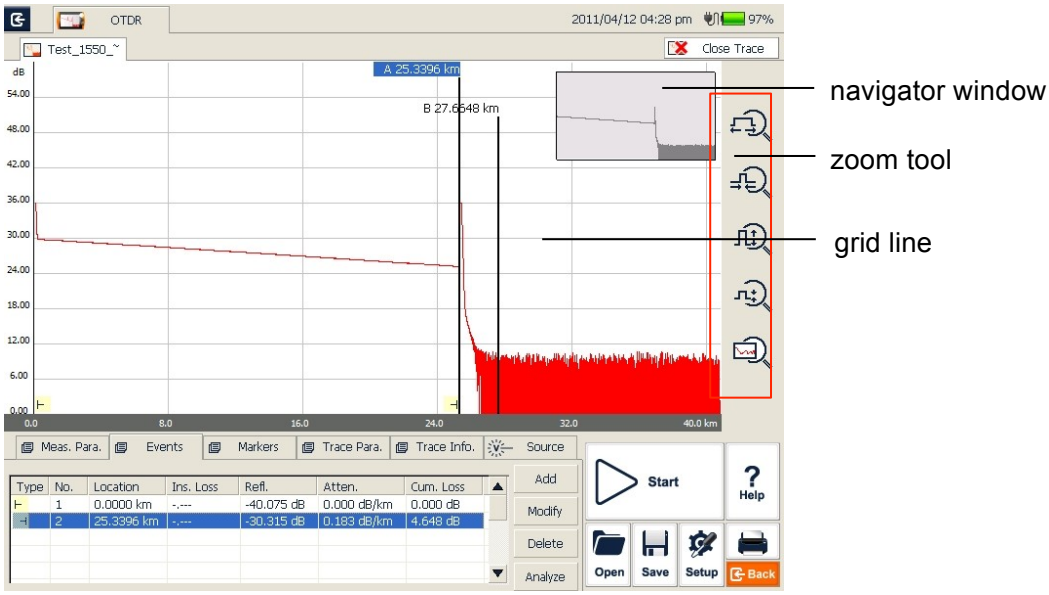


Fig 11.1 Trace file opened

NOTE

- Check or open ".jpg" format trace file, please use the "File Explorer" in {program}.
- Can't open bidirectional trace file on instrument. If need to, use the bidirectional analysis program provided by MTP-Suite which installed on computer.

11.2 Simultaneous display multi traces

In order to let user compare trace files, AD1000 support opening and displaying multi traces.

When open multi traces, current trace is red, the icon in front of the file name is red, other icons are grey.

Open single trace or multi traces, user need to set.

Open multi traces setting:

In OTDR [Setup], in the options of test, select the "Support multi traces".

NOTE System can open 4 traces at the same time. When need to open other traces, please close some opened traces.

11.3 Close trace file

Close trace file:

Click [close trace] button on the upper right corner of the interface to close the trace file.

NOTE Using tip: when under single trace mode (none multi traces mode), open new trace will close the opened trace automatically, this will reduce the operating steps and make it easier to use.

11.4 Trace display and operating instruction

After trace opened, application program will display the trace and analysis result in the trace window. The events on the trace will be marked by small icons, these events marked and display below the trace.

X axis shows the relative distance from the testing point.

The number on the Y axis shows the reflection power value (relative power) and its range.

After get the trace, the trace display parameters can be revised (like grid line and zoom window screen). Please refer to the paragraphs of "trace display parameters configuration"

NOTE The content of trace window change accord to options change. Some items of trace can be saw all the time, but other items displayed when select to display them or switch the options from one to another.

Event options:

In {event} options, there are various parameters of events listing, including event type, number, position, insert loss, reflection loss, attenuation and accumulation and etc.

When switch to {event}, application program will display a marker on the tracing graph.

When some event in event list is selected, the marker will move to that event position and indicate.

When open multi traces, event options only display current trace.

Markers Options

When switch to {Markers} options, application program display two Markers A and B, or include some gauge points. Particular cases depend on the function button in the button area.

Move these Markers along the trace to calculate loss, attenuation, reflection and etc.

Can use the buttons in Markers area to relocate all Markers and also can drag them in trace display window. Can use spinning hand wheel move the Markers accurately.

11.5 Switch and move Markers

There are many ways can switch and move Markers, users can choose one from them or use them in combination way to increase efficiency

- In trace displaying area, use stylus or mouse select A/B Markers or label above Markers, then can press and drag A/B tracing
- In the buttons area on the bottom of surface, click [ ] or [ ] to switch between A,B
- Press down the spinning hand wheel on the front panel will switch the Markers or mark the point
- After select Markers, continuously click [ ] or [ ] to move Markers.
- Can use the spinning hand wheel on the front panel to move the Markers accurately.
- After select marked point, click [ ], [ ], towards left or right to move the Markers.

NOTE

- For easier using, the position of Markers will be remembered, when open AD1000 and trace next time, the Markers will maintain the position operated last time.
- There is marked point when proceed the loss or reflection analysis.
- Spinning hand wheel can move the Markers accurately, but it's much slower when the trace is longer.

11.6 Switch and move the marked point

When proceed loss or reflection analysis, there will be marked point used for auxiliary test near the selected Markers.

There are various ways to switch, move the marked point, user can use one of them or use the combination to increase efficiency.

- Use stylus or mouse select marked point in the trace displaying area, then can press on and drag the marked point move in the trace service area to the target position.
- In the buttons area on the interface, click [ ] to switch circulated between the marked points under current Markers.
- Press down the spinning hand wheel on the front panel can switch or mark the point.
- After select the point, continuously click [ ] or [ ] can move the point.
- Can use the spinning hand wheel to move the marked point accurately.

NOTE

The points under each Marker in the process of movement:

- Marked points on the left side can't cross the Markers to the right side
- Marked points on the right side can't cross the Markers to the left side

11.7 Fast move the Markers outside the window

When magnify the trace, Markers may be positioned outside of the window.

When the Markers on the left side outside the window, there will be a sign on the left margin of the window: A←or B←

When the Markers on the right side outside the window, there will be a sign on the right margin of the window: →A or →B

Drag the signs above mentioned can move the Markers in to current window.

11.8 Lock AB Markers

In the surface of {Markers}, press down [|A-B|], A and B Markers will be bounded.

After AB Markers bounded, when moving one Marker, the other one will move with it and the distance maintains the same.

For some special tests, this function maybe more convenient.

NOTE When one Markers move to the trace boundary, the distance between AB won't maintain. But it will revert when it's not on the trace boundary.

11.9 Zoom the trace

In order to check the event or detail in the trace, it need to zoom the trace.

System provide two ways to zoom the trace for easier use for the user

1. Zoom the trace by cross frame, operation is smooth and fast
2. Use the zoom toolbar on the right side, operation is easier and directly perceived

NOTE

- After magnify operation, Markers may disappear from the current trace window
- Method 2, it need to open option of "display zoom toolbar"

11.10 Cross frame to zoom the trace

In the trace display area, magnify the traces by cross frame from upper left to lower right.

In the trace display area, contract the trace from upper right to lower left

Repeat above operation mentioned to magnify or contract the trace continuously

NOTE

- Do not cross to the outside of the trace display area, otherwise the operation won't have a respond
- The trace can't be magnify unlimited, it can't be magnified after a certain degree.
- The trace can't be contracted more after contracted to 1:1 size
- Application program will maintain the zoom situation for further test and check of similar trace.

11.11 Use zoom toolbar to zoom the trace

On the right side of trace window, there is a zoom toolbar vertical ranked. Can use the zoom toolbar to zoom the trace to check the event detail on the trace.

NOTE

- Press the magnify button for the first time, trace window will display the trace in the middle
- After the trace magnified, in order to move trace window, click the place outside the magnified area, trace window will move around this place. Also can use the direction key on the front panel to move the trace.

11.11.1 Revert the whole trace view

Click [ ] to revert the whole trace view

11.11.2 Zoom In Trace Horizontally

Click [ ] to zoom in the trace horizontally.

11.11.3 Zoom out Trace Horizontally

This function is to zoom out trace horizontally.

Click to zoom out trace.

11.11.4 Zoom in Trace Vertically

Click [ ] to Zoom in trace vertically.

11.11.5 Zoom out Trace Vertically

Click [ ] to Zoom out trace vertically.

11.12 Remember the zoom status automatically

In the process of testing or opening trace, the magnified proportion and position will be remembered temporary. When test under the same distance once again, the magnified status of the window remain the same for continuous test.

NOTE

- When user turns off AD1000, the zoom info won't be reserved. Turn on AD1000 again; trace window will revert to whole trace status.
- When user changes wavelength, pulse width and time, as long as the distance is not changed, auto memory of zoom status will be effective
- When user changes the distance, trace window will revert to whole trace status.

11.13 Move the magnified trace window

After the trace magnified, the trace window will only display part of the trace. There are two ways to move the trace window:

1. Use stylus or mouse to operate in navigation window.
2. Use 4 direction keys on the front panel to operate.

To move magnified trace window in the navigation window

In the navigation window, can see the position of current window on the whole magnified trace. Click some place outside the magnified area in the navigation window, trace window will move to the place correspondingly.

NOTE In navigation window, if click the shadow region (display scope of magnified window), the operation invalid

Use direction keys to move trace window

As to the magnified trace, press down the direction keys on the front panel, the trace window will move correspondingly.

- Click "△" , the trace window move upward
- Click"▽ ", the trace window move downward
- Click "◁", the trace window move towards the left
- Click "▷, the trace window move towards the right.

NOTE When display the whole trace, the trace window can't be moved.

11.14 Operation of event options

Event sheet list all the events tested on the trace. Event can be defined as point where optical transmission occurred change. Events are constituted loss which

caused by transmission, splice, connector or crack. If event was not in the certain threshold, it was defect event.

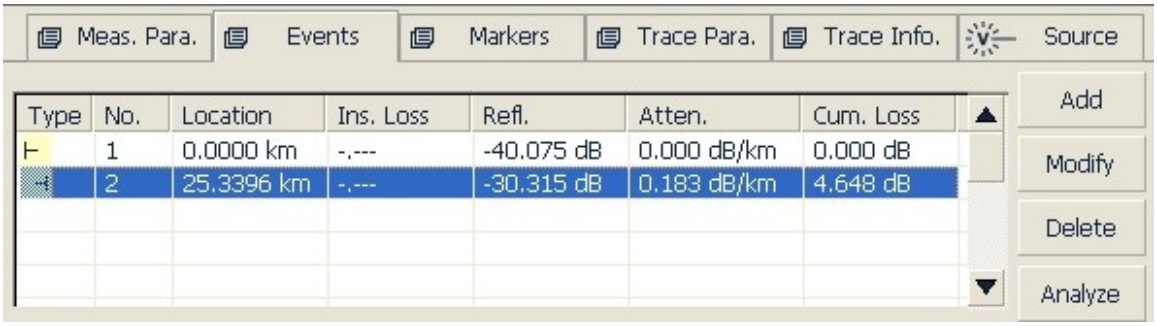


Fig 11.2 Events options

As to every event in the even sheet, display follows info:

- Type: Different indicator used for different event type instruction. As to the detailed indicator instruction, please refer to the paragraphs previous
- Number: Event number(one continuous number designated by OTDR application program)
- Position: Distance between OTDR and event or event and starting point of optical fiber link
- Insert Loss: The loss of every event by unit of dB(calculated by application program)
- Reflection value: Calculated value for each event.
- Attenuation: The attenuation for each optical fiber length(loss/distance)
- Accumulation: The accumulating loss from the link starting point to the end of the link.

NOTE Accumulating loss calculates the events listed in the event sheet and doesn't calculate the hidden events. About the more accurate link loss, please refer to the loss result displayed in {Markers}

11.14.1 Display the event on the trace and locate event in even sheet

Through rolling the event sheet, user can check the relative info about all events tested on the trace. When an event selected, there will be Markers appear on the trace which above the event.

NOTE

- When the trace under magnification status, event and its Markers may not in the current window.
- It is better to locate event under whole trace status and then magnify to see the detail.

11.14.2 Add Event

User can insert event into event sheet at any time manually. For example, when there is a splice point on some given position, but as it hidden in the noise or the splice loss lower than the minimum value of non-reflection detecting threshold, then the analysis didn't test that point, this operation will be quite useful. User can manually add this event to the event sheet. This will add a number on the insertion position but won't modify the trace.

NOTE

Important hint: When reanalyze the trace; the inserted event will be removed.

Add event:

1. Press[add] on {Event} label

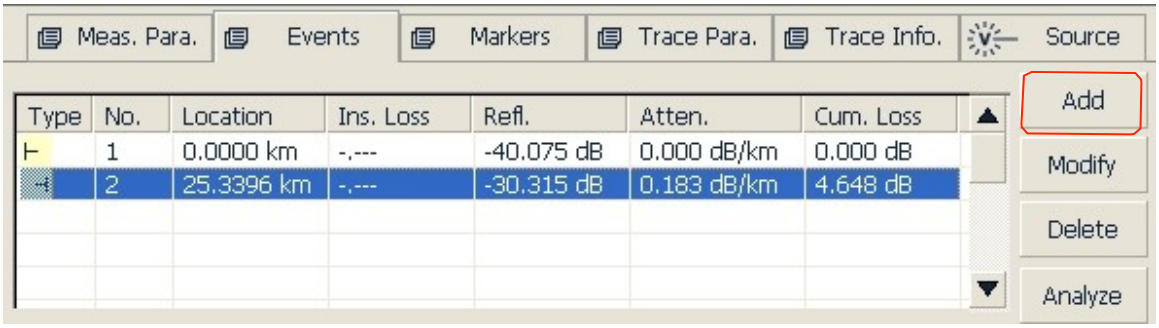


Fig 11.3 Add event

2. Fill in the event info in the add event dialog window.

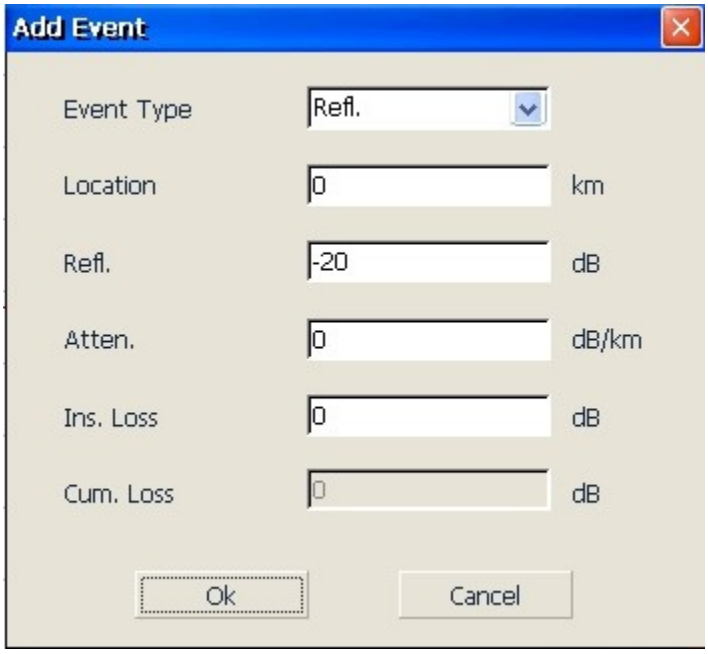


Fig 11.4 Add Event Dialog Window

3. Press [Enter] to save and back to main window after edit finished, the event will appear in the event list. If pressed [cancel], it will quit without save.

NOTE

There are reflection event and non-reflection event for inserted event.

11.14.3 Modify the event

User can modify the event in the event sheet manually. For example, when there is an event analysis result unmatched the observed result, user can modify it through this function.

NOTE

- Event modification won't result the modification of trace data.
- When reanalyze the trace, events will be re-marked, modified event will revert to original value.

Modify event

1. Press [modify] after select an event in events options.

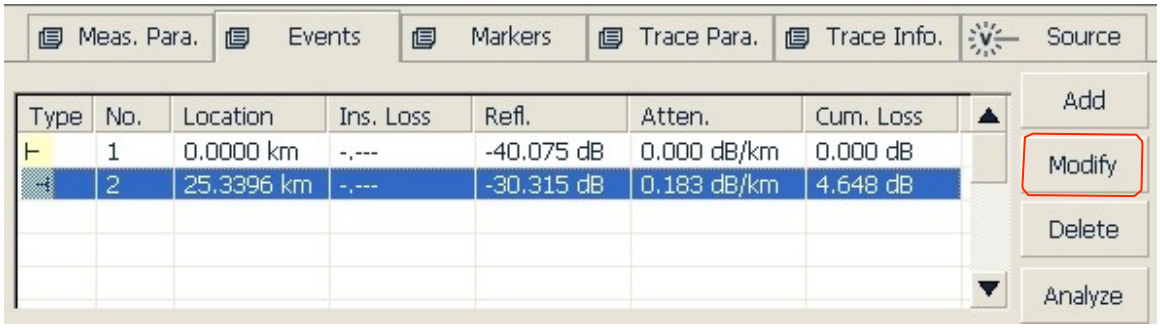


Fig 11.5 Modify events

2. To modify the event info in the event modification popups

Fig 11.6 Modify Event

3. Press [Enter] to save and back to main window after edit finished, the event will appear in the event list. If pressed [cancel], it will quit without save.

11.14.4 Delete event

Except following events, almost all of the events can be deleted from event sheet.

- Analysis finished
- Starting point of the link
- End point of the link

NOTE

Important hint: The only way to recover the deleted items is to reanalyze the trace, like analyze new trace. Please refer to the part "analyze or reanalyze trace"

Delete event

1. Select the event need to be deleted
2. Click the {Delete} on the right side

3. Press "Yes" when the program hint or press "No" don't delete event and go back to main interface.

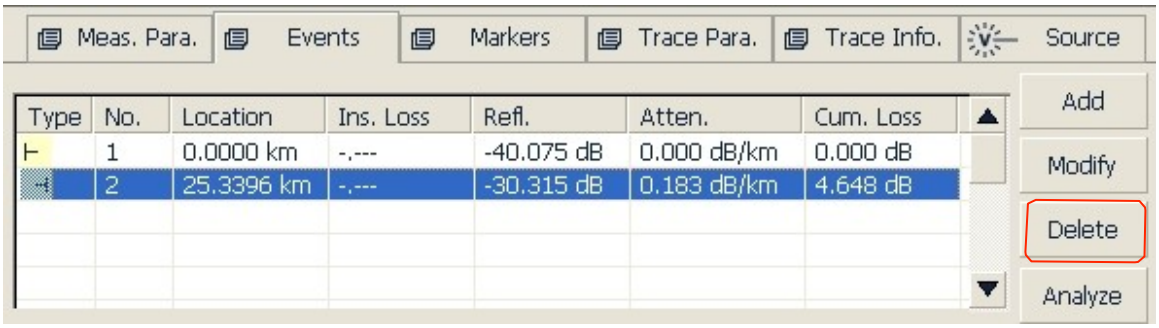


Fig 11.7 Delete Event

11.15 Analysis detecting threshold configuration

In order to optimize the event detection, user can set follow analysis detecting threshold

- Change non reflection threshold (splice loss threshold): It can display or hide small non reflection event.
- Change the reflection threshold (Reflection threshold): It can hide the fake reflection event caused by noise, turn the harmless reflection event to loss event or check the event which may cause damage to network and other optical fiber equipment.
- Change the finish threshold(optical fiber end threshold): It can analyze the important loss event(like breakpoint) and stop the event analysis after that event

NOTE

"Auto" mode and "Manual" mode can use these thresholds.

11.16 Set analysis detecting threshold

1. own [Setup] in the button area which in the lower right area to enter setting surface.

2. Set these parameters in the parameters analysis part. In the ralative edit frame, enter value needed or press[default value] revert the default value.

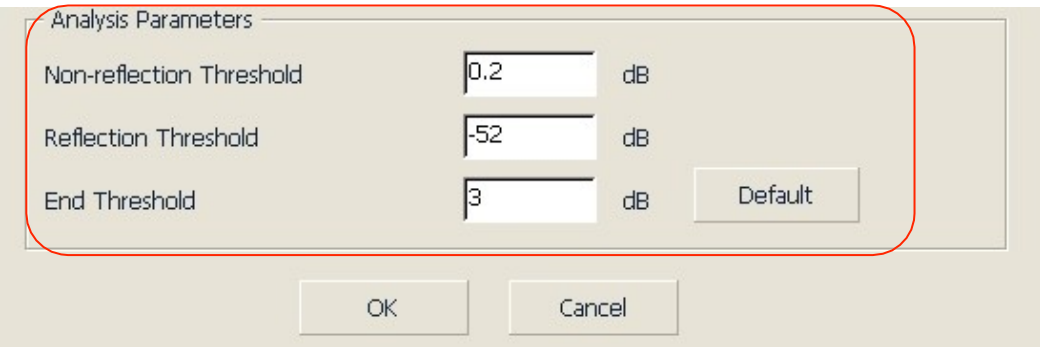


Fig 11.8 Parameters analysis edit frame

3. Press [application] to save setting and then quit setting surface; If press [cancel], it will quit without setting saved.

NOTE Analysis detecting threshold just set will used for trace tested after the set and reanalysis of the trace.

11.17 Reanalyze the trace

User can reanalyze the trace. Reanalyze the trace has follow effects:

- Create new event sheet for trace
- Reanalyze the trace got by the software of latest version
- Re-found the original event sheet(if the event sheet has been modified)

NOTE

Application program will analyze the newest tested trace. User can check the analytic result in the event options

Reanalyze the trace:

1. In the [event] options, press [analysis], it will reanalyze the whole trace
2. After analysis finished, the new analytic result will be listed in the event sheet.

NOTE

- If user wished to find some new events or filter some events he didn't pay attention, please change the analysis detecting threshold first and then to proceed the analysis.
- Effected by instrument features or detecting threshold, the analytic result may be inconsistent to the result user preconceive

11.18 Analyze the optical fiber in specific optical fiber link

As to the PON optical fiber link which has splitter, it need set the proper finish threshold (optical fiber end detecting threshold) to analyze the end event which through the splitter. Please refer to the sheet "Recommend parameters value of PON network optical fiber link)

Please change the analysis detecting threshold first and then to analyze. This will analyze some events after splitter correctly.

11.19 To set trace display parameter

User can modify follow trace display options before or after the test and trace opened

- Grid line: It can display or hide the grid line displayed on the Fig background; it will display the grid line under default status.
- Navigation window: It can display or hide the window which used for whole trace survey on the upper right position of the trace window.
- Length unit: it can select the length unit will be used in the whole application program

Before the trace opened, it can change follow trace display options:

- Multi trace: Control whether to open multi trace at the same time

- Zoom toolbar: It can display or hide the zoom icon area which on the right side; will get maximized trace display area after hide the zoom toolbar. The zoom toolbar is displayed under default status.

NOTE For the first time entering OTDR functions surface, the help info for simple operation displayed in the trace area and can't see the navigation window and grid line. Only after test or after the trace opened can see the grid line and navigation window.

To set the trace display parameter

1. To press [Setup] in the button bar which on the lower right of the OTDR menu.
2. In the options of test display area, select and modify the display options
3. Press [application] and make change become effective, then quit the setting dialog box; or press [cancel] to quit the setting dialog box without setting save.

Fig 11.9 Options of test display area

NOTE To hide or display the zoom toolbar must turn off all the trace opened. Otherwise the setting won't go into effect.

11.20 Set the length unit

In the OTDR parameters setting dialog box, select the length unit in the test display area options. The unit can be meter, feet or mile.

NOTE

- The default length unit is meter.

- Some certain values such as pulse width, wavelength and etc won't change along with the distance. Pulse indicated by second, wavelength indicated by nm
- When select m as length unit, system will display km in some place
- When select ft as length unit, system will display kft in some place
- When select mi as length unit, system will display kmi in some place

11.21 Display or switch the trace

In the OTDR test application program, when opened multi trace, there are two ways to switch the displayed trace

1. To hide or display the trace: click the file name label on the upper left.
2. Or click the [close trace] on the surface upper right to close current trace.

11.22 Check current trace parameters

Check current trace information on {Trace Info.} label.

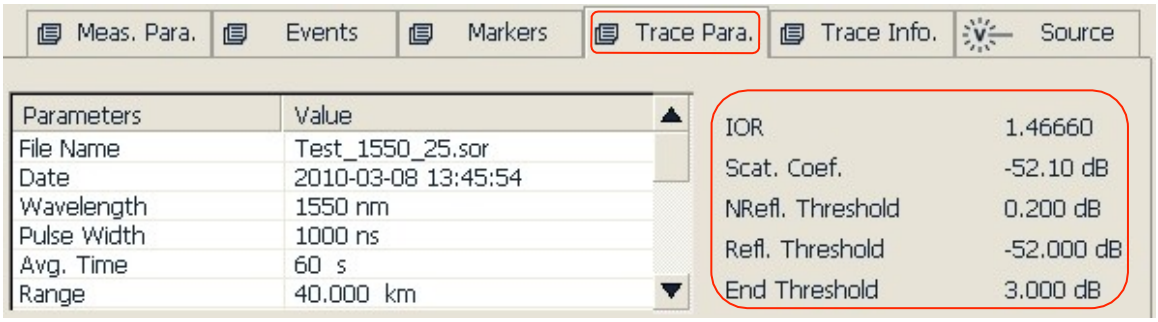


Fig 11.10 Check the trace parameters

The content displayed is shown below:

File name, save date and time, test wavelength, test pulse width, test time, test distance, total loss, average loss.

- File name: The name of current trace
- Date: Date and time of test.
- Wavelength: Laser wavelength used for test
- Pulse width: Laser pulse width used for sampling
- Averaging time: Continuous sampling time
- Range: Distance used for test

- Link length: The length of optical fiber link calculated after test
- Link loss: The total loss of the link starting point to the link end
- Link attenuation: Average loss of the total link, indicated as function of distance
- Event quantity: Total events number got from current trace analysis which is accord to test parameters

The content displayed on the right:

IOR, back scatter, splice threshold, reflection threshold, end detecting threshold.

- IOR: Indicate the trace IOR (also called group coefficient). If modify this parameter, it will adjust the trace distance test
- Back scatter: Rayleigh back scatter parameter setting of the displayed trace.
- Non-reflection threshold: Check the current setting of small non reflection event during the trace analyzing.
- Reflection threshold: Check the current setting of small reflection event during the trace analyzing.
- End threshold: Check the current setting of the loss of important events(will affect the transmission performance during the trace analyzing)

NOTE Trace parameters options only displays the selected trace even multi traces are opened. Please switch to the trace if you want to display the parameters of other traces. The trace selected is in red color.

12 Manual Trace Analysis

User can use markers and zoom tools to measure splice loss, attenuation and reflection, or use markers to locate event position and relative power level.

12.1 Use Markers

Click {Markers} label in OTDR main interface to activate markers.

12.2 Event Location and Loss Information

OTDR application automatically calculates event location and display the location in events list. User can manually check event location and distance between events. Loss information can be also displayed. The X-axis represents distance and Y-axis represents relative power.

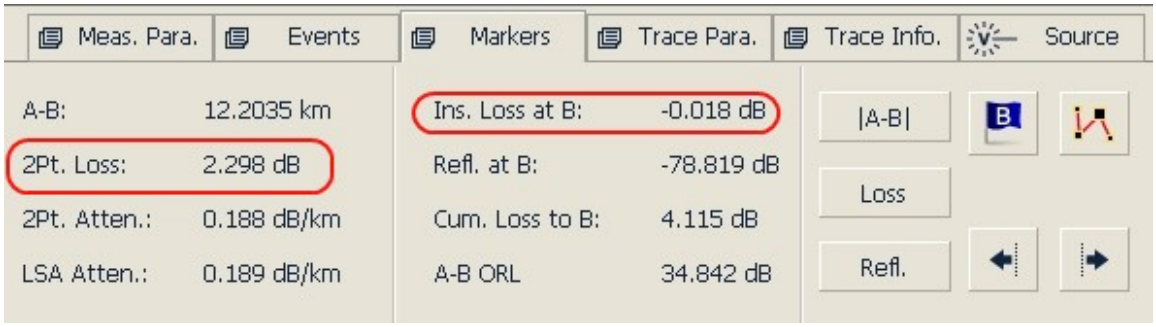


Fig 12.1 Event location and loss information

To acquire event location and loss information

1. Click {Markers} label in OTDR main interface.
2. Place marker A or B to at the beginning of the event, the marker label will show distance.
3. Fig 12.1 shows the insertion loss of current marker and A-B loss.

12.3 Measure Insertion Loss (2-point and 5-point method)

Insertion loss (unit: dB) is calculated by measuring the signal level of Rayleigh backscatter (RBS) and the magnitude of reduction. Insertion loss can be created by reflection and non-reflection events.

System calculates real timely the loss between Marker A and B, and also calculates the insertion loss at Marker A or B. Insertion loss is calculated in 5-point method.

2-point method (A-B Loss):

Insertion loss is calculated as shown in Fig. 12.2.

Fig 12.2 2-point Loss

2-point method is suitable for measuring splice loss but not applicable to measuring reflection events.

NOTE

- ”A-B Loss” is for quick loss measurement of certain segment of the fiber marked between Marker A and B.
- “”A-B Loss” is not applicable to me applicable to measuring reflection events.

5-point method to measure event loss:

Event loss is measured by 5-point method. When the [Loss] button in "Markers" Label is not pressed, the marking points used by 5-point method will not display, however, the system use 5-point method by default.

When apply 5-point method manually, the marker and its related 4 marking points divide the trace around the event into 2 areas: the left to the active marker and the right to the marker, the 2 marking points on the left and the 2 on the right both form a straight line, move the two lines close to the event center and the power difference between the two lines is the event insertion loss.

It also applies to the measurement of point A's or B's insertion loss.

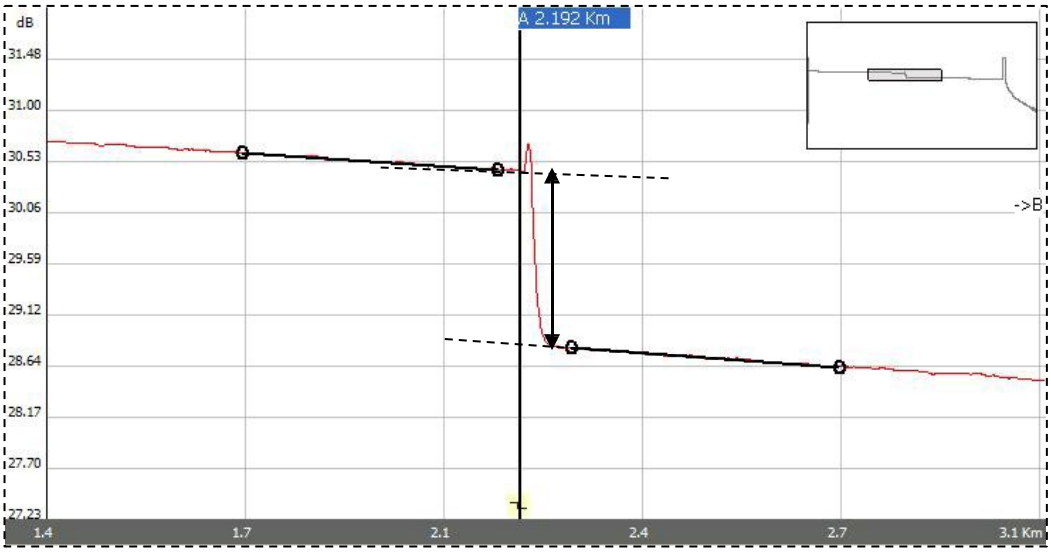


Fig. 12.3 5-point method

When [Loss] button is pressed, AD1000 will show the marking points to measure the event loss. When Marker A is selected, the screen will display the 4 marking points related to Marker A. When Marker B is selected, the screen will display the 4 marking points related to Marker B. The Markers and marking points can move separately.

The procedure to apply 5-point method:

1. In the main interface of AD1000 OTDR module, click "Markers" label;
2. Press **[Loss]** button, Marker A, Marker B and their related marking points will be displayed on the trace;

3. Zoom the trace to view the event clearly, move Marker A to the end of linear part of the trace before the event;
4. Move the first marking point to the beginning of the linear part of the trace before the event;
5. Move the second marking point to the end of the linear part of the trace before the event;
6. Move the third marking point to the beginning of the linear part of the trace after the event;
7. Move the fourth marking point to the end of the linear part of the trace after the event;

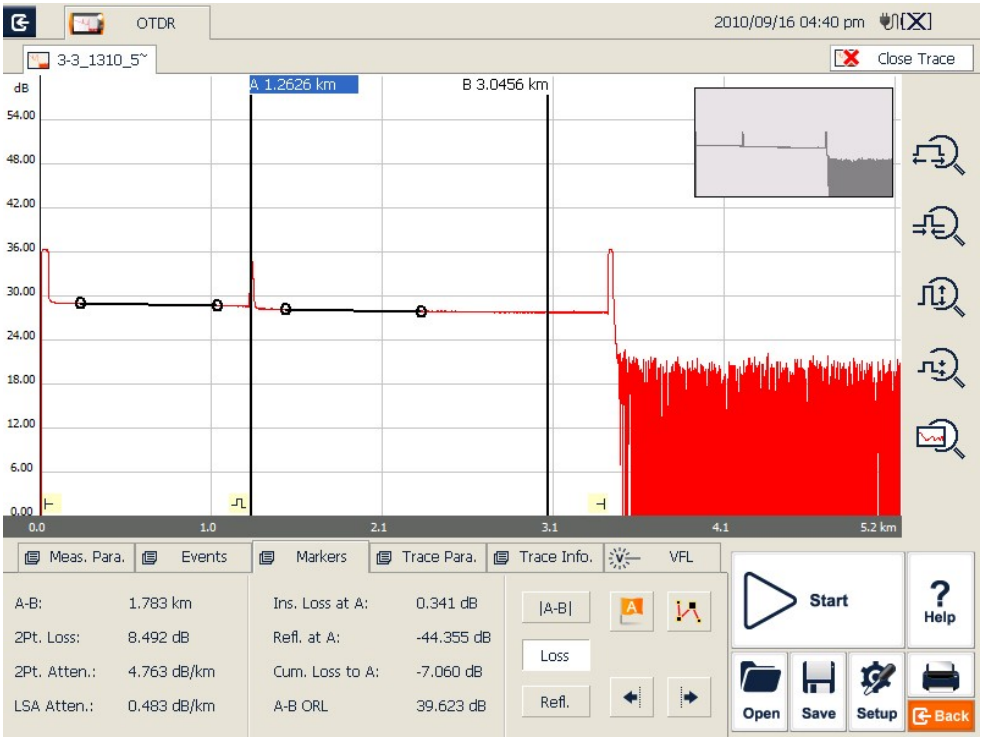


Fig. 12.4 Measure insertion loss in 5-point method

NOTE

- The marking points on the left of the active marker cannot be moved the right and vice versa.
- The loss showed in the Event List is measured by 5-point method.

12.4 Measure Attenuation (2-point and LSA method)

2-point method measures the attenuation between Marker A and B calculated by all the loss over the distance between Marker A and B (Unit: dB/Km).

LSA (least-squares approximation) method use linear regressions that is applied to the backscatter before and after an event (Between Marker A and B) to estimate the attenuation in the backscatter resulting from the event's loss. LSA method only measures the amplitude (decibel) change between the crossing points of the trace with Marker A and B.

Compared to 2-point method, LSA method is more accurate because it is less sensitive to trace noise and suitable for measuring splice attenuation. However, LSA method should not be applied to measure attenuation when there are reflection events between Marker A and B.

Measure attenuation:

1. Click {Markers} label in OTDR main interface to show Marker A and B.
2. Place Marker A and B at different points on trace.
3. Zoom in the trace to adjust marker position when necessary.
4. Check 2Pt. Atten. (2-point attenuation) and LSA Atten. (LSA attenuation) values, as shown in Fig. 12.5.

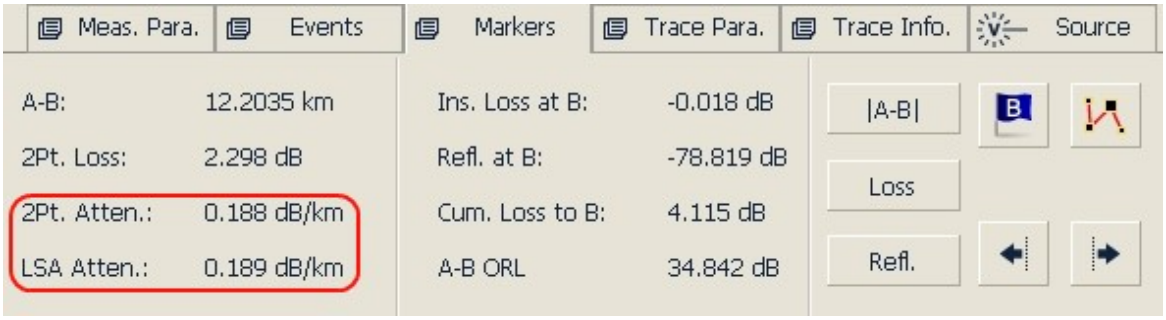


Fig. 12.5 View attenuation

NOTE There should not be any event between Marker A and B when measuring attenuation with 2-point method.

12.5 Measure Reflectance

Reflectance is the ratio of reflected power (Pr) to incident power (Pi) of an event (such as a connector).

Reflectance = 10 log (Pr/Pi).

1. Click {Markers} label in OTDR main interface to show Marker A and B.
2. Click [Refl.] button to show marking points.
3. Before measurement, zoom in the trace and place Marker A to the end of linear part of the trace before the event.
4. Move the first marking point to the beginning of the linear part of the trace before the event and Marker A.
5. Move the second marking point to the end of the linear part of the trace before the event and Marker A.
6. Place the marking point behind Marker A to the peak of the reflection event to be measured.
7. View the reflectance.

NOTE Above process is applicable to measuring all reflection events' reflectance even they are very close to each other.

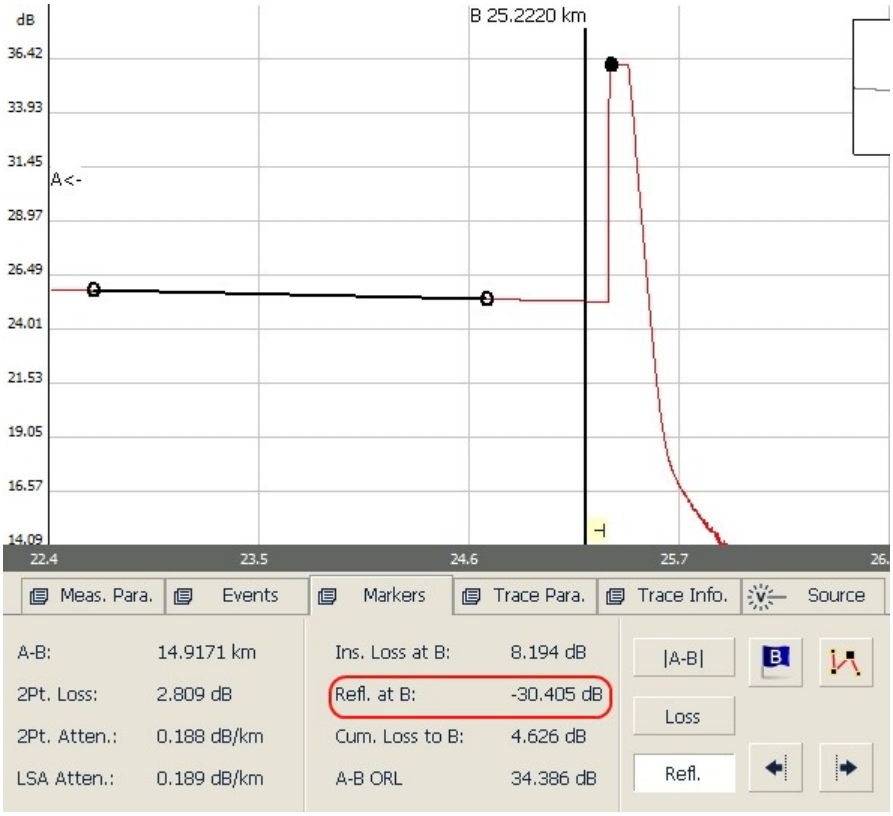


Fig 12.6 Measure reflectance

NOTE For non-reflection events, reflectance will show as "-----"。

13 Trace File Management

User can save, open, rename and delete trace file after acquisition.

User can save and open trace file in OTDR main interface.

User can rename, copy, move and delete file in **File Explorer**.

13.1 Save Trace in Different Formats

In OTDR main interface, user can choose trace saving format as Bellcore (.sor) or JPEG (.jpg).

13.2 Copy, Move, Rename and Delete Trace

There are two ways to copy, move, rename and delete trace.

Way 1: Though **File Explorer:**

A. In AD1000 main interface, click {Program} label and click **[File Explorer]** icon as shown in Fig 13.1:

Fig 13.1 File explorer

B. Click [ ] button or press button on front panel to enter File Explorer.

C. Click "SDMMC_Disk" icon to enter internal memory space.

D. Copy, move, rename and delete trace.

E. After operation, click [ ] button to return to main interface.

NOTE

- In **File Explorer**, the file and directory operation is similar to Windows 98/XP system.
- User can move, rename and delete files saved in "SDMMC_Disk" but the disk itself cannot be moved, renamed or deleted.
- For more information, please refer to the Help file on AD1000.

Way 2: User can connect AD1000 to PC, AD1000 will be recognized as a mobile device. User can copy, move, rename and delete files in PC's Windows System.

13.3 Check Disk Space

User can check disk space utilization status (used space and free space) in **File Explorer**:

1. Enter **File Explorer** in AD1000 main interface.
2. Click "SDMMC_Disk" icon and select [File] <Properties> or click and hold "SDMMC_Disk" icon, select <Properties> from pop-up menu.
3. "SDMMC_Disk" space utilization status is shown below:

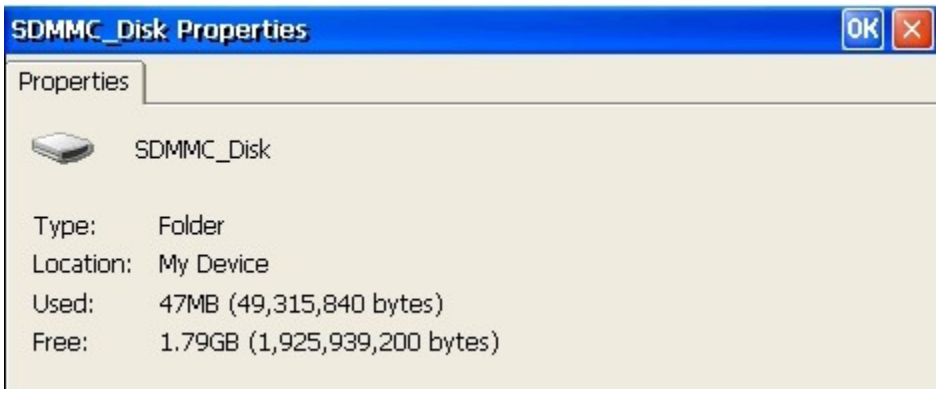


Fig 13.2 Check disk space utilization

4. Click "OK" to exit disk properties.

NOTE It's suggested to check disk space utilization status from time to time and transfer or back up files to avoid insufficient disk space when AD1000 is in use.

14 Print OTDR Report

User can manage saved trace files in AD1000 and print report.

For reference and report priting, it is necessary to manage and update trace information.

14.1 Trace Information

After trace acquisition, user can add or update tested fiber information which includes: Cable ID, Fiber ID, Fiber Type, Start Location, End Location and Operator.

14.2 Check and Edit Trace Information

Use can check and edit trace information in {Trace Info.} function window.

When newly tested trace is saved, the trace is saved with above information.

User can also edit saved trace information and save the trace with updated information.

NOTE

- After editing trace information of a saved trace, the updated trace file name will show a star sign ("*") to indicate the change. If user closes the editing window without saving, system will promote user to save.
- The update to trace information is only effective to current active trace in Multi-trace display mode.
- Editing trace information does not affect measurement parameters and result.

Edit and save trace information:

1. Click {Trace Info.} label in OTDR main interface.

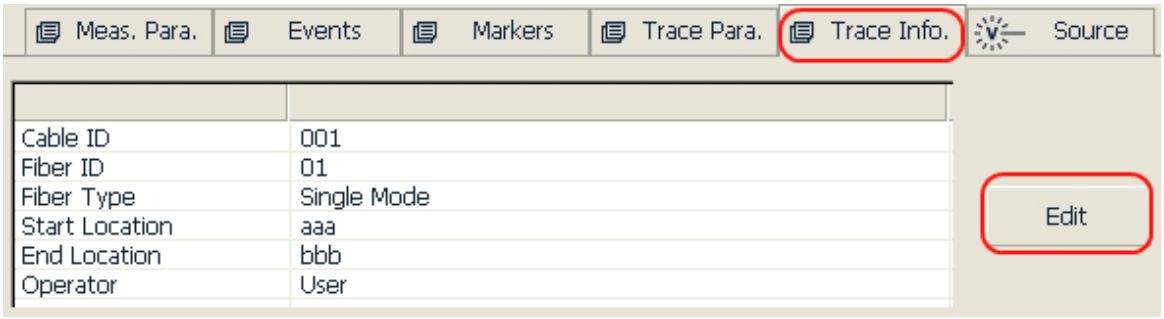


Fig 14.1 Trace information and editing

2. Press [Edit] button and trace window will pop up.
3. Input trace information in the pop-up window.

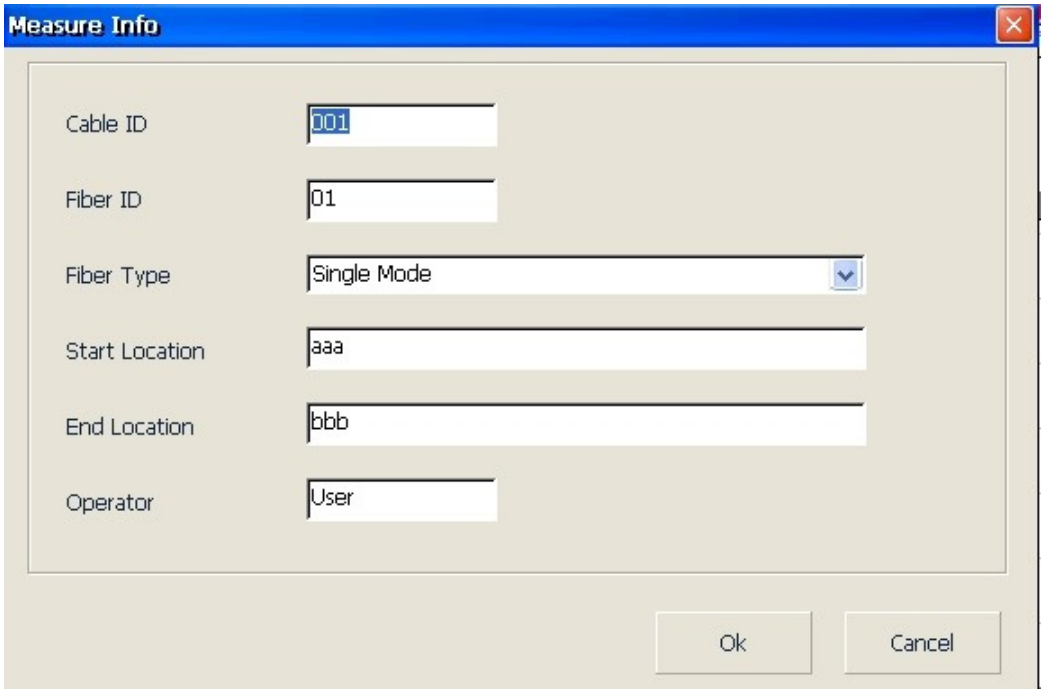


Fig 14.2 Edit trace information

4. After editing, press [Ok] to save and return to main interface; click [Cancel] to leave without change.
5. Click [Save] button in OTDR main interface to save the trace again and the updated information will be saved with the trace file.

NOTE

- Edited and saved trace can be used as a template for user's later reference.
- User can also use MTP-Suite to edit and save trace information.

14.3 Print OTDR Report

AD1000 support direct connection to USB printer for printing.

OTDR report includes trace information, measurement parameters, trace, markers information, event list and etc.

Detailed contents to be printed can be specified in Print Option.

Print OTDR report:

1. Connect USB printer to AD1000

   For first printing, please first configure printer, please refer to **2.7 Printer Configuration**

2. Click [ ] button in OTDR main interface and printing dialog window will pop up.

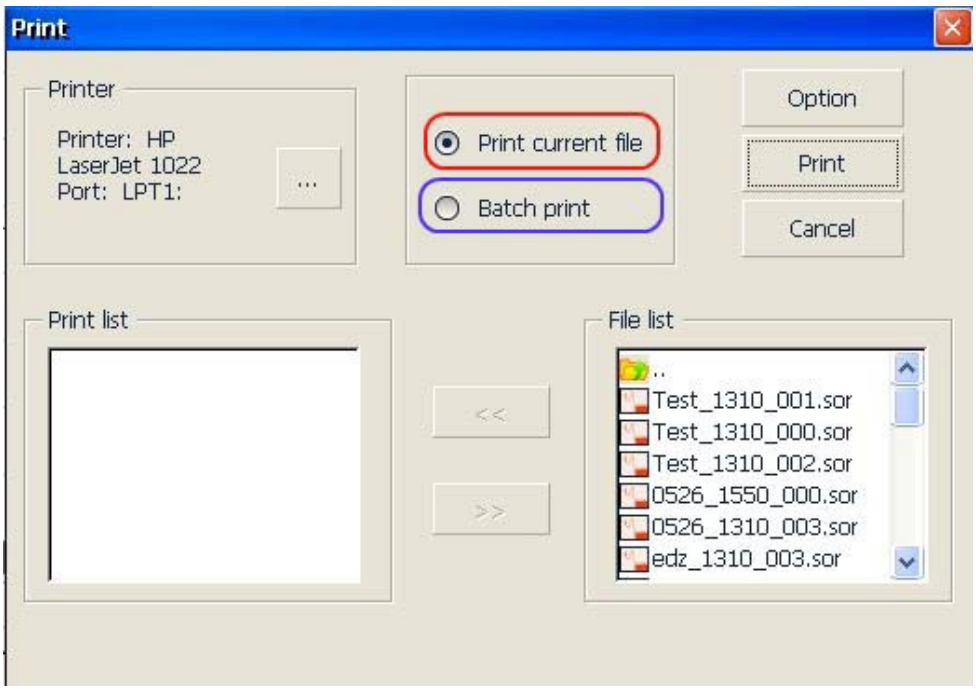


Fig 14.3 Printing dialog window

3. Choose the traces to be printed:
   A. To print current file, please check "Print current file" option and only one trace will be printed.
   B. To print unopened traces saved in AD1000, please check "Batch print" option which support up to 8-traces printing.
4. Print Option:

   User can customized OTDR report by clicking [Option] button on printing dialog window to specify the contents to be printed.

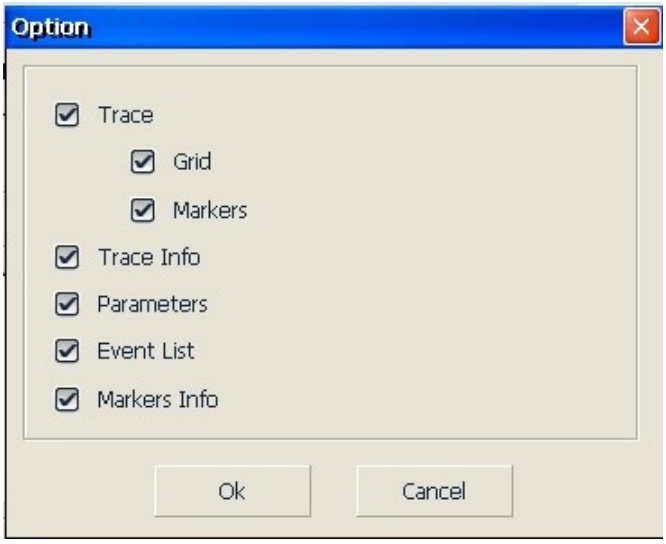


Fig 14.4 Printing options

5. Press [Print] button to start printing.

During printing, system will promote a message as "Printing…Pease wait", shown in Fig 14.5.

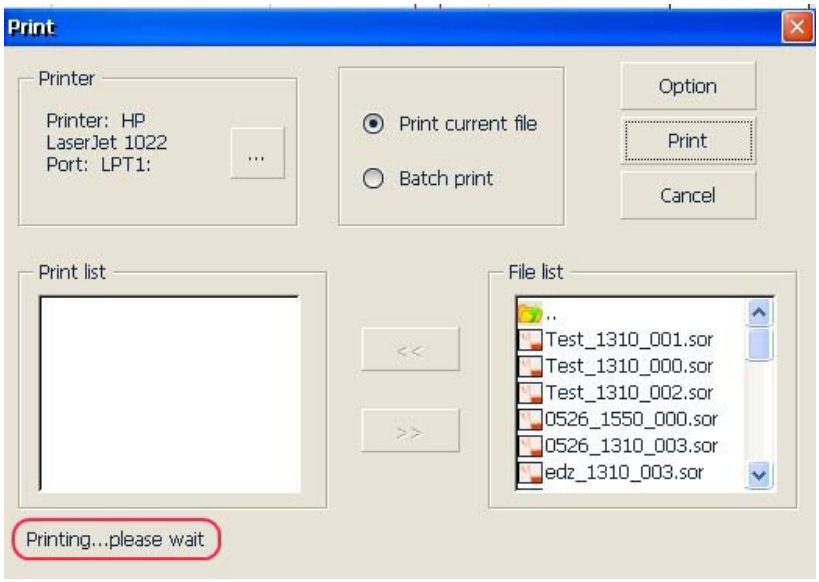


Fig 14.5 Printing

6. After printing is finished, system will return to main interface.

15 VFL Application

The built-in VFL of OTDR module can shoot red laser into the tested fiber, the red laser will glow at the marco bend, breaking points and bare fiber end. The maximum detection range for AD1000 VFL is over 5Km, it is a practical tool for fiber identification, detecting and highlighting breaks, tight bends, splices or defective connectors in optical fibers.

VFL is a perfect complementary tool to OTDR for its visualized detecting method in close range like OTDR deadzone.

NOTE VFL is only available with the OTDR module equipped with VFL.

Fault locating with VFL:

1. Clean connector properly.
2. Connect tested fiber to VFL port.
3. Click { Source} in OTDR main interface.
4. Check "CW" option to emitter laser continuously or check "Flash" to emitter modulated laser at 1Hz.
5. Press [VFL On] button to start VFL and the icon will turn orange.
6. When VFL is working, press [VFL Off] to turn off VFL and the icon will turn back to grey.

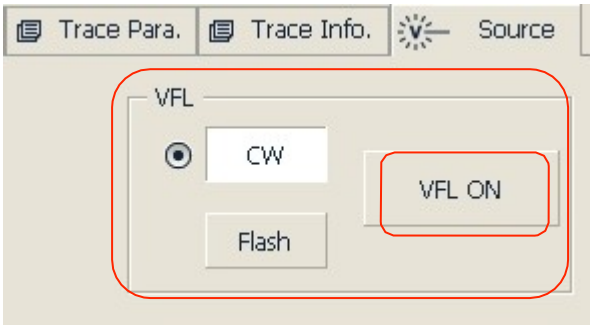


Fig 15.1 VFL operation

16 Instruction of MPN Module of AD1000

16.1 Main Features of MPN Module

- Simultaneous Triple-play PON signals at 1310, 1490, 1550nm wavelength measurement
- Burst mode 1310nm upstream signal detection & measurement
- Dual-port pass through design
- Stabilized laser source at 1310, 1490, 1550, 1625nm wavelength
- Optical power meter at 850, 1300,1310,1490,1550,1625nm calibrated wavelength

Laser Radiation: To avoid serious eye injury, never look directly into the optic outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers.

- Always avoid looking directly into the optic output port, when the instrument is working.
- Always replace protective dust caps on the detector port when the instrument is not being used.
- Always avoid looking directly at the unconnected end of optic fiber in testing and make the unconnected end pointing at a non-reflective object, if possible.

16.2 MPN Module Interface

When power on, it will show the main menu automatically.

In main menu, select"Multi-Func module", click

button to enter MPN user interface, as follows:

Fig 16.1Multi-func Module

16.3 PON Power Meter of MPN Module

Click Multi-func module to enter the interface as shown in Fig 16.2
Click the different modules shown on the top left screen to shift different module interfaces among "PPM (PON Power Meter)", "SLS (Stabilized Laser Source)", "OPM (Optical Power Meter)", "LTS (Loss Test)"

NOTE "Shift different module interfaces" only available when there are two or above modules.

Click [Start] button or Press "▶/■" （Start/Stop） button on AD1000 front panel to start the measurement. Click [Stop]button or Re-Press "▶/■"（Start/Stop）button on AD1000 front panel to stop the measurement.

NOTE The function icon turns red while switching on this function module.

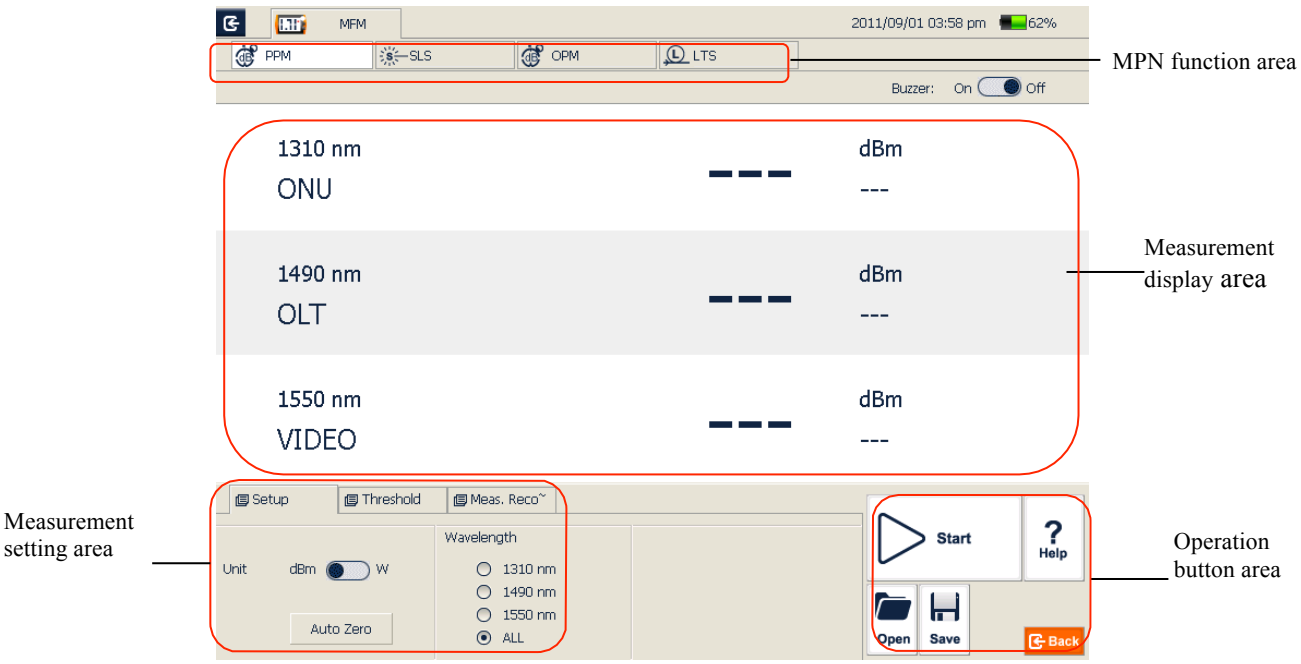


Fig 16.2 PON Power Meter Interface of Multi-func Module

Under "PPM", there are three setting interfaces: "General Setup", "Threshold Setting", and

"Measurement Record".

"General Setup" interface is shown in Fig 16.2.

"Buzzer": Switch on or off to open/close the alarm buzzer function. When the instrument inspects power value beyond normal range, buzzer will automatically give an alarm while this function is switched on.
"Unit": Switch to select "W" or "dBm".
"Auto Zero": This function provides an easy method of auto zero of power meter, which can be used to rectify the instrument's power value under non-luminous state in daily testing.

NOTE Put protective cap on optical power testing output, and ensure that the tie-in is completely airproof and no laser signal.

"Wavelength": Select to display one wavelength individually or three wavelengths together.

Create or delete Threshold value in the "Threshold" interface is shown in Fig 16.3.
Click "setup"=> "Current Thre. Set" to select a certain threshold set.
Or select the ready threshold set on the left. Click a certain threshold set and then the information will be shown on the right area.

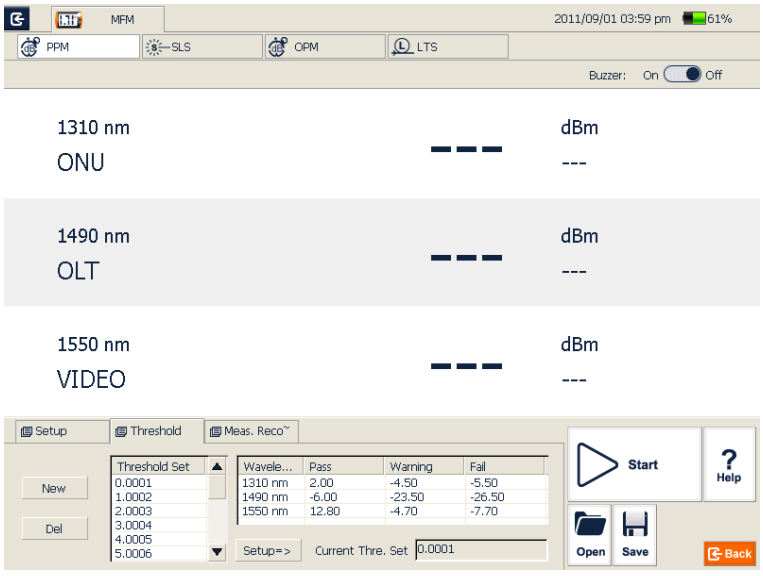


Fig 16.3 PON Power Meter – Threshold Interface

Double-click the certain Threshold Set to modify Thres. Set as shown in Fig 16.4. Click OK to save the setting.

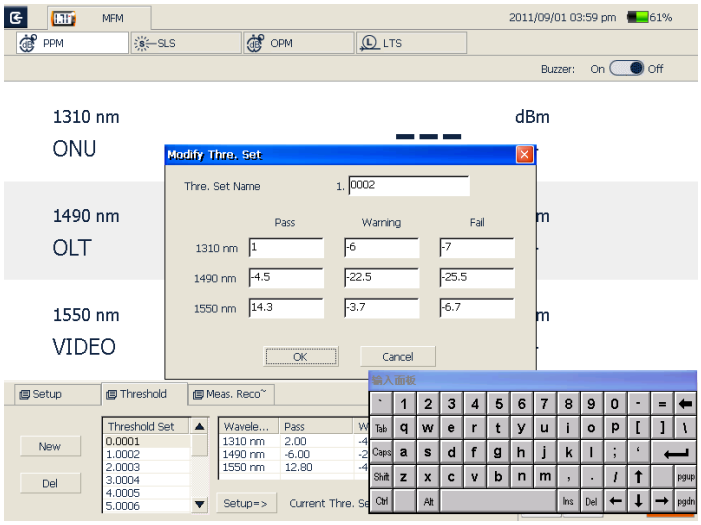


Fig16.4 PON Power Meter- Modify Threshold Set

"Measurement Record" interface is shown as Fig 16.5.

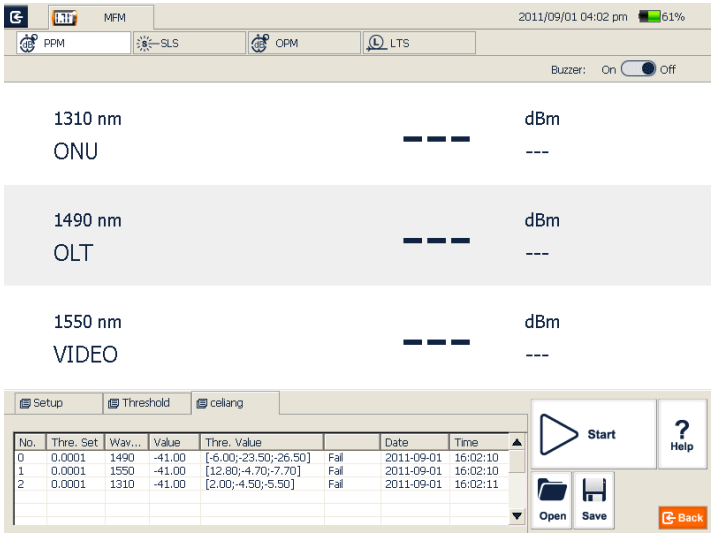


Fig 16.5 PON Power Meter – Measurement Record

The name will be changed according to the user's input. As "Celiang" shown in the Fig. Click "Open" icon to select the named measurement record file. Or input a new file name in "Name" blank as shown in Fig 16.6.

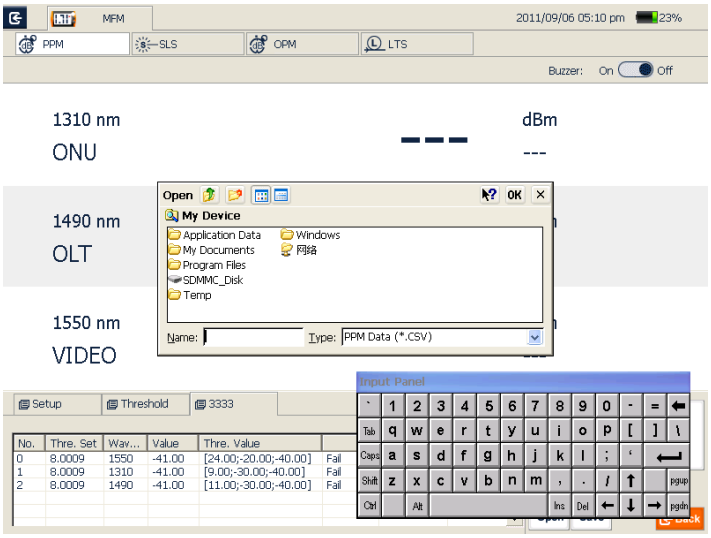


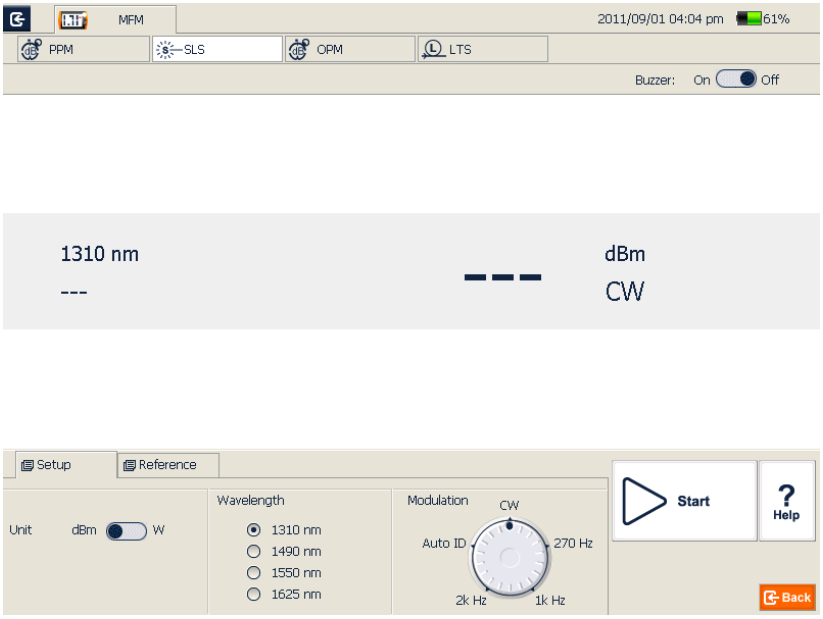
Fig 16.6 PON Power Meter-Open

Click "Save" to save the records during the measurements.

16.4 Stabilized Laser Source of MPN Module

Under "SLS", there are two setting interfaces: "General Setup", "Reference Setting".

"General Setup" interface is shown as Fig 16.7



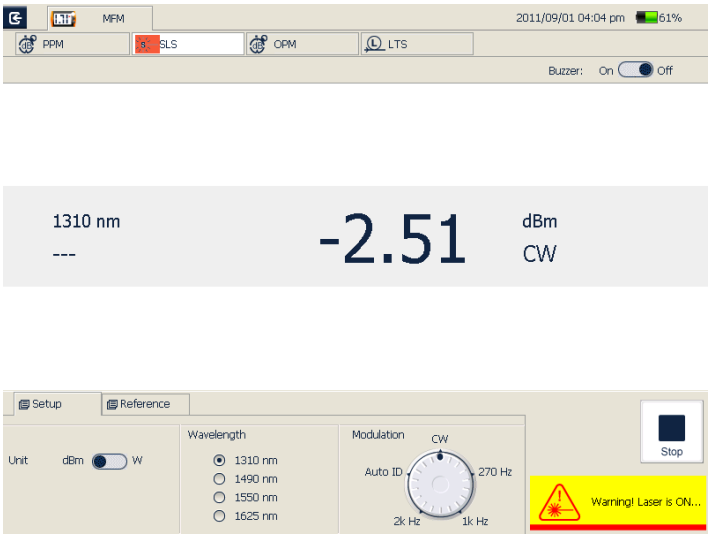


Fig16.7 Stabilized Laser Source – Setup Interface

"Unit": Shift between dBm and W.

"Wavelength": Support 1310, 1490, 1550, 1625nm wavelengths selectable.

"Modulation": Select different modes at 270Hz, 1KHz, 2KHz、Auto ID.

After the setup, click Click [

] button or Press "▶/■"（Start/Stop）button on AD1000 front panel to start the measurement. Click [

]button or Re-Press "▶/■"（Start/Stop）button on AD1000 front panel to stop the measurement.

NOTE The function icon turns red while switching on this function module.

"Reference setting" interface is shown as Fig 16.8

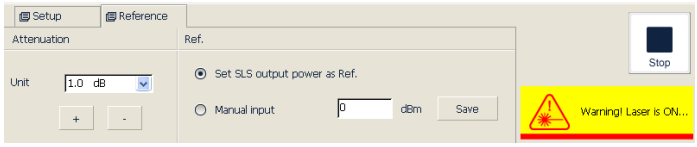


Fig 16.8 Stabilized Laser Source – Ref. Setting

"Attenuation": Select from steps at 1.0dB, 0.5dB, 0.1dB, 0.05dB. The adjustable range of output power is 6 dB.
"Ref.": Select "Set SLS output power as Ref" or "Manual input" to set the Ref. Click "Save" to save the Ref. setting.

16.5 Optical Power Meter of MPN Module

Click "OPM" icon to enter Optical Power Meter interface as shown in Fig 16.9.

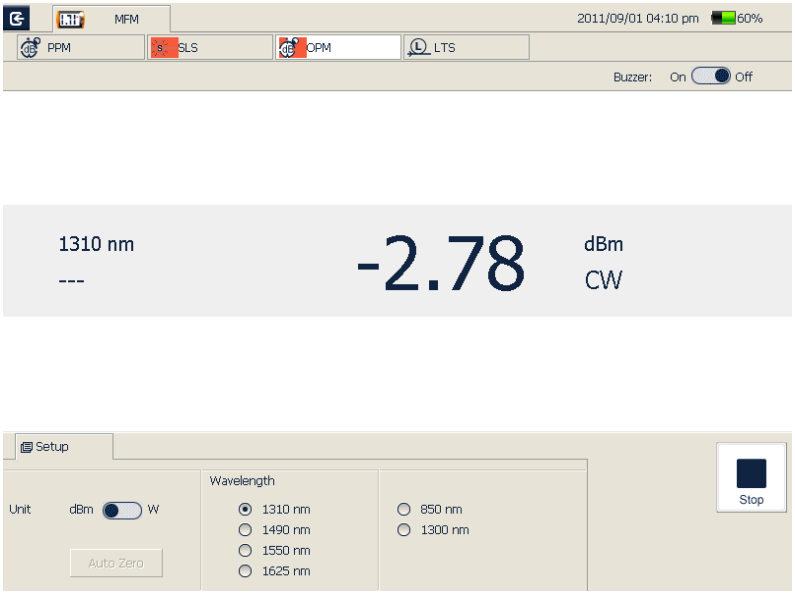


Fig 16.9 Optical Power Meter

After the setup, click [ ] button or Press "▶/■" (Start/Stop) button on AD1000 front panel to start the measurement. Click [ ]button or Re-Press "▶/■" (Start/Stop) button on AD1000 front panel to stop the measurement.

NOTE

- The function icon turns red while switching on this function module.
- The wavelength of OPM will be changed to the current wavelength automatically if the Modulation set of SLS is Auto ID.

"Unit": Shift between dBm and W.
"Auto zero": This function provides an easy method of auto zero of power meter, which

can be used to rectify the instrument's power value under non-luminous state in daily testing.

NOTE Put protective cap on optical power testing output, and ensure that the tie-in is completely airproof.

"Wavelength": Support 850, 1300, 1310, 1490, 1550, 1625nm wavelengths selectable.

16.6 Loss Test of MPN Module

Click "LTS" icon to enter Loss Test interface as shown in Fig 16.10.

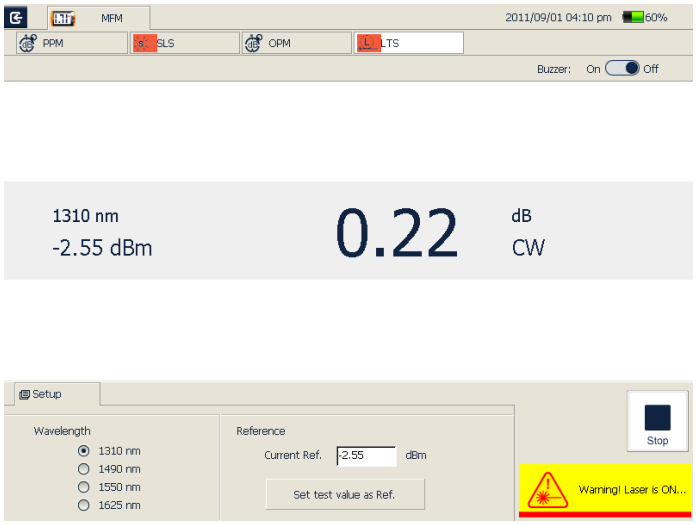


Fig16.10 Loss Test

click [Start] button or Press "▶/■ "（Start/Stop）button on AD1000 front panel to start the measurement. Click [Stop]button or Re-Press "▶/■ "（Start/Stop）button on AD1000 front panel to stop the measurement.

NOTE The function icon turns red while switching on this function module.

"Wavelength": Support 1310, 1490, 1550, 1625nm wavelengths selectable.
"Ref.": Select "Set test value as Ref" or "Manual input" to set the Ref.

17 File Management

User can directly copy, move, rename and delete file or folder on AD1000.

Files can also be exchanged between AD1000 and external storage devices like USB flash disk, USB hard drive and PC.

AD1000 is equipped with two types of USB ports:

- USB host (Type A, flat) for connecting to USB storage devices.
- USB (Type B,) for data communication between AD1000 and PC via USB cable.

17.1 Transfer Files or Folders between AD1000 and USB Storage Device

1. Connect USB storage device to AD1000 USB port.
2. Click **File Explorer** icon on {Program} label to enter **File Explorer** where active drives including USB drives and folders are displayed for file management.
3. After file transfer, user can directly unplug the USB storage device from AD1000.

In case USB storage device is not shown in **File Explorer**, please close **File Explorer** and enter again.

17.2 Transfer Files or Folders between AD1000 and PC

NOTE

Microsoft ActiveSync software must be installed first on PC for file transfer between AD1000 and PC.

Some necessary software shall be installed on PC before connecting AD1000 to PC. For more information about installation, please refer to the instructions in software setup CD.

1. If Microsoft ActiveSync software is not installed on PC, please install following the software setup instruction.
2. Connect the USB cable's type A end (flat) to PC and type B end ( ) to AD1000.
3. After Microsoft ActiveSync software is installed and indicates "Connected", click "Explore" to access the files and folders in AD1000; or enter AD1000 and access the files and folders from My Computer.

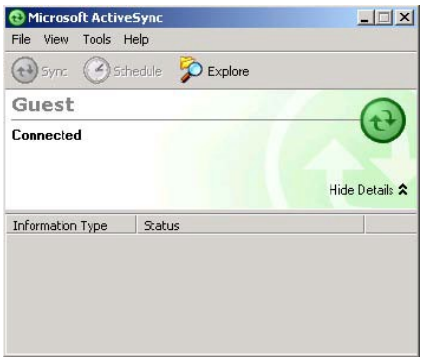


Fig 16.1 ActiveSync connected

4. After file transfer, simply disconnect the USB cable.

NOTE It's no need to turn off PC and AD1000 when connect and disconnect USB cable.

17.3 Delete Saved Files

1. Click **File Explorer** icon on {Program} label to enter **File Explorer**.
2. Click "\SDMMC_Disk" icon to enter internal storage space.
3. Select the files or folders to be deleted.
4. Click "Delete" in "File" menu to delete.

18 Maintenance and Calibration

18.1 Cleaning of Optical Interfaces

Interfaces must be kept clean. Special alcohol may be used to clean optic output. Always replace protective dust caps when the unit is not being used, and keep the protective dust caps clean.
In addition, flanges must be kept clean periodically.

18.2 Necessity of Cleaning

The diameter of optic core is 9um, and diameter of dust and other particulates ranges from 1/100 to 1/1/10 um. Comparatively speaking, the size of dust and other particulates can cover part of optic end and therefore degrade the performance of AD1000.

In addition, power density may burn dust into optic fiber and induce further damage (for example, 0dBm optic power may produce about 16000000W/m*m power density in single mode fiber). In this case, measurement will be inaccurate and irreversible.

18.3 Safety Instructions before Cleaning

a) Make sure AD1000 is power off when cleaning
b) Any operations contradict to the instructions may result in dangerous laser injuries
c) Make sure laser source is off, when clean any optic connectors
d) When AD1000 is in operation, please always avoid looking directly into optic output. Although laser radiation is invisible, it may do serious injury to eyesight
e) Be cautious of electric shock and make sure AC power is disconnected with AD1000 before cleaning. Always use dry or moistest soft cloth

to clean the outside of AD1000, and never clean the inside f)
Please do not add any accessory to optic instrument or adjust AD1000 at discretion

g) For maintenance, always go to qualified or certified professionals

18.4 Cleaning Tools

a) Optic fiber cleaner (for cleaning of optic connectors)
b) Optic fiber cleaning rod (for cleaning of optic outputs)
c) Optic fiber cleaning tissue (for cleaning optic interfaces)
d) Isopropyl alcohol
e) Cotton ball
f) Paper tissue
g) Cleaning brush
h) Condensed air

18.5 Cleaning Procedure

a) Screw off the cap of flange
b) Clean the laser head carefully
c) Screw on the cap of flange

18.6 Battery Charging Instructions

Typically, AD1000 Lithium battery supports over 7 hours continuous working.

Charging status is indicated in system main interface and AD1000 front panel indicator.

1. In system main interface, charging status is displayed in the right upper corner.

Icon	Description
	DC input is on
70%	Battery remaining power

2. Front panel charging indicator ( ) also indicated charging status (Please refer to 1.4 Front Panel Indicators Introduction).

18.7 Battery Instruction

NOTE

- New battery is not fully charged, please charge the battery before the first time use which takes approximately 4 hours.
- Charging time is subject to the type of functional modules in use, environment and etc.
- After the battery is used for some time, its capacity may not match charging status indication (e.g. charging indicator indicates full but AD1000 may power off due to low battery), then battery calibration is necessary (Please refer to 17.9 Battery Calibration).

WARNING!

- Please do not store battery in the environment where temperature is over 60℃ (140F).
- Use specified charger to charge the battery.

18.8 Charge Battery

Plug the charger to AD1000 and power outlet, charging process automatically starts and finishes after battery is fully charged.

18.9 Battery Calibration

After the battery is used for some time, the battery gauge may not be accurate, e.g. it

indicates battery has run out but the battery can still provide power supply, or battery power is zero, but the battery power can last a long time. Then the battery should be re-calibrated.

Procedure:

1. Run out of the battery completely.
2. Charge the battery until fully charged.

18.10 Change Battery

1. Power Off AD1000 and unplug power adaptor.
2. Open the battery dock cover.
3. Change battery.
4. Close the battery dock cover.

NOTE

- Please note if the power indicator on front panel is off before changing battery, make sure AD1000 is completely off before changing battery.
- Only factory can change clock battery.

18.11 Calibration Requirements

Calibration of AD1000 is recommended every two years. Please contact our representatives or nearby customer service centers for proper calibration.

18.12 Shipment

During shipment, please keep AD1000 in prescribed temperature range.

Please note following points to protect AD1000 during shipment:

- Use original packing materials.
- Avoid excessive temperature and humidity change.
- Avoid direct exposure to sunlight.
- Avoid shock and vibration.

19 Troubleshooting

19.1 Common Problems and Solutions

Problem	Possible Reason	Solution
Power on failure	Battery power run out	◆ Charge the battery ◆ Change a new battery ◆ Connect AD1000 to external power supply.
	External power supply is not connected	Connect AD1000 to external power supply.
	External power supply is unplugged	Make sure external power supply is well connected on both ends.
	Battery dock cover is not closed properly	Close the battery dock cover properly
Black Screen	Screen backlight is off, but power indicator is on.	Press any key to exit power saving mode.
	Battery run out, AD1000 is off, power indicator is off.	◆ Charge the battery ◆ Change a new battery ◆ Connect AD1000 to external power supply.
External keypad no response	External keypad is not recognized.	◆ Unplug the keypad and re-plug ◆ Power off AD1000, plug keypad and power on AD1000 again.
External mouse no response	External mouse is not recognized.	◆ Unplug the mouse and re-plug ◆ Power off AD1000, plug mouse and power on AD1000 again.
Screen display blurs	Brightness is not set properly	Adjust brightness
Application no response	Problem error	Restart AD1000 and run the application again.
Operation time is short	Battery run out	Change the battery
	Battery is not fully charged	◆ Charge the battery ◆ Re-calibrate the battery

Touch screen is not responding properly with stylus	Touch screen needs calibration	Connect external USB mouse to calibrate the stylus.
AD1000 indicates low battery after battery is fully charged	Battery is not fully charged.	Re-calibrate the battery

19.2 Trace Measurement Problems and Solutions

Problem	Possible Reason	Solution
Expected events are not shown in the trace	Events are too close to each other.	◆ Try again with short pulsewidth ◆ Try testing from the other end of the fiber
	SNR is poor	Try again with wide pulsewidth or increase averaging time.
	Wrong configuration	Check OTDR parameters, like Reflection threshold, non-reflection threshold and end threshold, re-analyze or test again.
Special events appear at the end of the trace	Wrong configuration, e.g. wrong end threshold setting.	Adjust configuration and test again.
	The fiber under test is too long to exceed the range.	Select proper range and test again.

20 Warranty

20.1 Terms of Warranty

All AD INSTRUMENTS products are warranted against defective material and workmanship for a period of one (1) year from the date of shipment to the original customer. Any product found to be defective within the warranty period would be repaired or replaced by AD Instruments free of charge.

20.2 Exclusion

The warranty on your equipment shall not apply to defects resulting from the following:

- Unauthorized repair or modification
- Misuse, negligence, or accident

AD Instruments reserves the right to make changes to any of its products at any time without having to replace or change previously purchased units.

20.3 Warranty Registration

A warranty registration card is included with the original shipment of equipment. Please take a few moments to fill out the card and mail or fax it to the local Customer Service Center of Shineway Technologies, Inc. to ensure proper initiation of your warranty term and scope of your warranty.

20.4 Returning Instruments

To return instrument for reasons of yearly calibration or other, please contact the local Customer Service Center of Shineway Technologies, Inc. to obtain additional information and a RMA# (Return Materials Authorization number). And describe briefly reasons for the return of the equipment, to allow us offer you more efficient service.

NOTE

To return AD1000 in the case of repair, calibration or other maintenance, please note the following:

- Be sure to pack AD1000 with soft cushion like Polyethylene, so as to protect the shell of AD1000.
- Please use the original hard packing box. If use other packing material, please ensure at least 3 cm soft material around AD1000.
- Be sure to correctly fill out and return the warranty registration card, which should include the following information: company name, postal address, contact, phone number, email address and problem description.
- Be sure to seal the packing box with exclusive tape.
- Be sure to ship to our local representative or directly to us in a reliable way.

20.5 Contacting Customer Service

Please check our web site **(www.adinstruments.es)** for updates to this manual and additional application information. If you need technical or sales support, please contact local Customer Service.

AD INSTRUMENTS:

Address: Cardeña 9
Postal Code: 28029 Madrid, Spain
Tel: +34 916613036
Web: www.adinstruments.es
Email: info@adinstruments.es